

**GOVERNMENT OF INDIA
MINISTRY OF POWER
CENTRAL ELECTRICITY BOARD**

**THE INDIAN ELECTRICITY RULES, 1956
(AS AMENDED UPTO 25TH NOV., 2000)**

**UNDER SECTION 37 OF THE INDIAN ELECTRICITY
ACT, 1910 (9 OF 1910)**

**REGULATING THE GENERATION, TRANSMISSION,
SUPPLY AND USE OF ELECTRICAL ENERGY AND
GENERALLY TO CARRY OUT THE PURPOSES AND
OBJECTS OF THE SAID ACT**

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**MINISTRY OF IRRIGATION AND POWER
NOTIFICATION**

New Delhi, the 26th June, 1956

S.R.O. 1455. In exercise of the powers conferred by section 37 of the Indian Electricity Act, 1910 (9 of 1910), the Central Electricity Board hereby makes the following rules, the same having been previously published as required by sub-section (1) of section 38 of the said Act namely:-

RULES

CHAPTER I
PRELIMINARY

- 1. Short title and commencement-**(1) These rules may be called the Indian Electricity Rules, 1956.
- (2) They shall come into force at once.
- 2. Definitions:-** (1) In these rules, unless the context otherwise requires,
 - (a) "the Act" means the Indian Electricity Act, 1910;
 - (b) "Accessible" means within physical reach without the use of any appliance or special effort;
 - (c) "Ampere" means a unit of electric current and is the unvarying electric current which when passed through a solution of nitrate of silver in water, in accordance with the specification set out in Annexure- I, deposits silver at the rate of 0.001118 of a gram per second; the aforesaid unit is equivalent to the current which, in passing through the suspended coil of wire forming part of the instrument marked "Government of India Ampere Standard Verified" when the suspended coil is in its sighted position, exerts a force which is exactly balanced by the force exerted by gravity in Calcutta on the counter balancing iridio-platinum weight of the said instrument;
 - (d) "Annexure" means an Annexure to these rules;
 - (e) "apparatus" means electrical apparatus and includes all machines, fittings, accessories and appliances in which conductors are used;
 - (ee) "authorised person" means a person authorised under rule 3;
 - (f) "bare" means not covered with insulating materials;
 - (g) "cable" means a length of insulated single conductor (solid or stranded or of two or more such conductors each provided with its own insulation, which are laid up together. Such insulated conductor or conductors may or may not be provided with an overall mechanical protective covering;
 - (gg) "flexible cable" means a cable consisting of one or more cores each formed of a group of wires, the diameter and the physical properties of the wires and insulating material being such as to afford flexibility.
 - (h) "circuit" means an arrangement of conductor or conductors for the purpose of conveying energy and forming a system or a branch of a system;
 - (i) "circuit breaker" means a device, capable of making and breaking the circuit under all conditions, and unless otherwise specified, so designed as to break the current automatically under abnormal conditions;

- (j) “concentric cable” means a composite cable comprising an inner conductor which is insulated and one or more outer conductors which are insulated from one another and are disposed over the insulation of, and more or less around, the inner conductor;
- (k) “conductor” means any wire, cable, bar, tube, rail or plate used for conducting energy and so arranged as to be electrically connected to a system;
- (l) “conduit” means rigid or flexible metallic tubing or mechanically strong and fire resisting non-metallic tubing into which a cable or cables may be drawn for the purpose of affording it or them mechanical protection;
- (m) “covered with insulating material” means adequately covered with insulating material of such quality and thickness as to prevent danger;
- (n) “cut out” means any appliance for automatically interrupting the transmission of energy through any conductor when the current rises above a pre-determined amount, and shall also include fusible cut-out;
- (o) “danger” means danger to health or danger to life or any part of body from shock, burn or other injury to persons, or property, or from fire or explosion, attendant upon the generation, transmission, transformation, conversion, distribution or use of energy;
- (p) “dead” means at or about earth potential and disconnected from any live system;

Provided that apparatus separated from a live conductor by a spark gap shall not be deemed to be “dead”;

Note:-The term “dead” is used only with reference to current carrying parts when these parts are not live.

- (q) “earthed” or “connected with earth” means connected with the general mass of earth in such manner as to ensure at all times an immediate discharge of energy without danger;
- (r) “earthing system” means an electrical system in which all the conductors are earthed;
- (s) deleted
- (t) “enclosed sub-station” means any premises or enclosure or part thereof, being large enough to admit the entrance of a person after the apparatus therein is in position, containing apparatus for transforming or converting energy to or from a voltage at or above medium voltage (other than transforming or converting solely for the operation of switch gear or instruments) with or without any other apparatus for switching, controlling or otherwise regulating the energy, and includes the apparatus therein;
- (u) “enclosed switch-station” means any premises or enclosure or part thereof, being large enough to admit the entrance of a person after the apparatus therein is in position, containing apparatus for switching, controlling or otherwise regulating energy at or above medium voltage but not for transforming or converting energy (other than for transforming or converting solely for the operation of switchgear or instruments), and includes the apparatus therein;

- ¹[(uu) “flameproof enclosure” means an enclosure for electrical machinery or apparatus that will withstand, when the covers, or other access doors are properly secured, an internal explosion of the inflammable gas or vapour which may enter or originate inside the enclosure, without suffering damage and without communicating the internal flammation(or explosion) to the external inflammable gas or vapour in which it is designed to be used, through any joints or other structural openings in the closure]
- (v) “guarded” means covered, shielded, fenced or otherwise protected by means of suitable casings, barrier, rails or metal screens to remove the possibility of dangerous contact or approach by persons or objects to a point of danger;
- (vv) “Hand-held portable apparatus” means an apparatus which is so designed as to be capable of being held in the hands and moved while connected to a supply of electricity;]
- (w) “Inspector” means an Electrical Inspector appointed under section 36;
- (x) “Inspector of Mines” means an Inspector appointed under the Mines Act,1952(35 of 1952)
- (y) “Installation” means any composite electrical unit used for the purpose of generating, transforming, transmitting, converting, distributing or utilizing energy;
- (z) “Intrinsically safe” as applied to apparatus or associated circuits shall denote that any sparking that may occur in normal working is incapable of causing explosion of inflammable gas or vapour;
- (aa) “lightning arrester” means a device which has the property of diverging to earth any electrical surge of excessively high amplitude applied to its terminals and is capable of interrupting follow current if present and restoring itself thereafter to its original operating conditions;
- (aaa) “linked switch” means a switch with all the poles mechanically linked so as to operate simultaneously;
- (ab) “live” means electrically charged;
- (ac) “metallic covering” means mechanically strong metal covering surrounding one or more conductors;
- (ad) “Neutral conductor” means that conductor of a multi-wire system, the voltage of which is normally intermediate between the voltages of the other conductors of the system and shall also include return wire of the single phase system;
- (ae) “non-licensee” means a person generating, supplying, transmitting or using energy to whom any of the provisions of Part III of the Act apply;
- (af) “occupier” means the owner or person in occupation of the premises where energy is used or proposed to be used;

- ¹[(aff) “officer appointed to assist the Inspector” means an officer appointed under rule 4A]
- (ag) “ohm” means a unit of electric resistance and is the resistance offered to an unvarying electric current by a column of mercury at the temperature of melting ice 14.4521 grammes in mass of an uniform cross-sectional area and of a length of 106.3 centimetres. The aforesaid unit is represented by the resistance between the terminals of the instrument marked “Government of India Ohm Standard Verified” to the passage of an electric current when the coil of wire, forming part of the aforesaid instrument and connected to the aforesaid terminals is in all parts at a temperature of 30° C.
- (ah) “Open sparking” means sparking which owing to the lack of adequate provisions for preventing the ignition of inflammable gas external to the apparatus would ignite such inflammable gas;
- (ai) “overhead line” means any electric supply line which is placed above ground and in the open air but excluding live rails of a traction system;
- (aj) “owner”, “agent” and “manager” of a mine have the same meanings as are assigned to them in the Mines Act, 1952 (35 of 1952);
- (ak) “portable apparatus” means an apparatus which is so designed as to be capable of being moved while in operation;
- (al) “portable hand lamp” means a portable light-fitting provided with suitable handle, guard and flexible cord connected to a plug;
- (am) “section” means a Section of the Act;
- (an) “span” means the horizontal distance between two adjacent supporting points of an overhead conductor;
- (ao) “street box” means a totally enclosed structure, either above or below ground containing apparatus for transforming, switching, controlling or otherwise regulating energy;
- (ap) “supplier” means a licensee, a non-licensee or any other supplier of energy, including the Government;
- (aq) “switch” means a manually operated device for opening and closing or for changing the connection of a circuit;
- (aqa) “switchboard” means an assembly including the switchgear for the control of electrical circuits, electric connections and the supporting frame;
- (ar) “switchgear” shall denote switches, circuit breakers, cut-outs and other apparatus used for the operation, regulation and control of circuits;
- (as) “system” means an electrical system in which all the conductors and apparatus are electrically connected to a common source of electric supply;
- (at) “transportable apparatus” means apparatus which is operated in a fixed position but which is so designed as to be capable of being moved readily from one place to another;

(au) “volt” means a unit of electro-motive force and is the electric pressure which, when steadily applied to a conductor, the resistance of which is one ohm, will produce a current of one ampere;

(av) “voltage” means the difference of electric potential measured in volts between any two conductors or between any part of either conductor and the earth as measured by a suitable voltmeter and is said to be;

“low” where the voltage does not exceed 250 volts under normal conditions subject, however, to the percentage variation allowed by these rules;

“medium” where the voltage does not exceed 650 volts under normal conditions subject, however, to the percentage variation allowed by these rules;

“high” where the voltage does not exceed 33,000 volts under normal conditions subject, however, to the percentage variation allowed by these rules;

“extra high” where the voltage exceeds 33,000 volts under normal conditions subject, however, to the percentage variation allowed by these rules;

(2) All other words and expressions used herein and not defined shall have the meanings respectively assigned to them in the Act;

3. Authorization – (1) A supplier or a consumer, or the owner, agent or manager of a mine, or the agent of any company operating in an oil-field or the owner of a drilled well in an oil field or a contractor for the time being under contract with a supplier or a consumer to carry out duties incidental to the generation, transformation, transmission, conversion, distribution or use of energy may authorise any person for the purpose of any or all of the following namely:-

Sub-rule(2) of rule 36, clause(a) of sub-rule(1) of rule 51 , clause (a) of sub-rule(1) and ¹[clauses (h) and (i) of sub-rule(2)] of rule 64, sub-rule(2) of rule 110, sub-rule(1) and (4) of rule 121, sub-rule(4) of rule 123, rule 124 and sub-rule(8) of rule 125.

²[(2) No person shall be authorised under sub-rule(1) unless he is competent to perform the duties assigned to him and possesses either on appropriate certificate of competency or permit to work;]

³(2A)(a) No person shall be authorised to operate or undertake maintenance of any part or whole of a generating station of capacity 100MW and above together with the associated sub-station unless he is adequately qualified and has successfully undergone the type of training specified in Annexure XIV;

Provided that the provisions contained in this sub-rule shall have effect in respect of the persons already authorised to operate or undertake maintenance of any part or whole of a generating station as aforesaid from the date to be specified by the appropriate Government, but such a date shall not be later than a period of ⁴[6 years 2 months] from the date this rule comes into force;

(b) The appropriate Government may, on the recommendations of the owner of

1. Ins. vide G.S.R. No.112, dated 1st April, 2000

2. Subs. vide G.S.R. 358, dated 9-5-1987

3. Ins. vide G.S.R. 461, dated 9-5-1981

4. Amended vide G.S.R. 481, dated 20-6-1987

such generating station, relax the conditions stipulated in clause(a) of this sub-rule for any engineer and such other person who have already sufficient experience in the operation and maintenance of a generating station;

(c)The owner of a generating station, in consultation with Central Electricity Authority may alter the duration and manner of training in respect of those persons who have already been engaged in the operation and maintenance of a generating station or a sub-station;

¹[(2B) The provisions contained in rule 3(2A) will also be applicable in respect of other sub-stations of 132KV and above from a date to be specified by the appropriate Government but such a date shall not be later than 3 years from which this rule comes into force;]

(3)No person shall be deemed to be authorised under sub-rule(1)unless his name has been entered in a list maintained at the office or premises of the person authorizing him, and giving the purpose for which such person is authorized and the entry has been attested by the authorized person and the person authorizing him.

(4)Every list maintained under sub-rule(3) shall be produced before an Inspector ²[or any officer of a specified rank and class appointed to assist the Inspector] when required;

(5)An Inspector may cancel or amend, in such manner as he considers necessary, any authorisation, made under sub-rule(1)

³[(6) In every registered factory, where more than 250KW of electrical load is connected, there shall be a person authorised by the management of the factory for ensuring the observance of the safety provisions laid under the Act and the rules made thereunder, who shall periodically inspect such installation, get them tested and keep a record thereof and such records shall be made available to the Inspector ²[or any officer of a specified rank and class appointed to assist the Inspector], if and when required.]

CHAPTER II

INSPECTORS

⁴[**4. Qualification of Inspectors** - No person shall be appointed to be an Inspector, unless-

(a)he possesses a degree in electrical engineering or its equivalent from a recognised University or Institution; and

(b)he has been regularly engaged for a period of at least eight years in the practice of electrical engineering of which not less than two years have been spent in electrical or mechanical engineering workshop or in generation or transmission or distribution of electricity, or in the administration of the Act and these rules, in a position of responsibility;

Provided that the appropriate Government may, for a period of seven years commencing on the date the Indian Electricity(Amendment-4) Rules,1986 are brought

1.Ins. vide G.S.R.730 dated 30-9-1989

2.Ins. vide G.S.R.466, dated 17-8-1991

3.Ins. vide G.S.R.358, dated 9-5-1987

4.Substituted vide G.S.R. No. 772 dated 20.9.1986.

into force, also appoint a person possessing recognised Diploma in Electrical Engineering and having prescribed experience to be an Inspector in respect of low and medium voltage installations only”]

4A. Appointment of officers to assist the Inspectors-

(1)The appropriate Government may, by notification in the Official gazette, appoint as many officers as it thinks fit to assist an Inspector;

(2)The appropriate Government may, by a separate notification in the Official Gazette, authorise certain officers appointed under sub-rule(1) for the purposes of ¹[sub-rule(4) and sub-rule(6) of rule 3] sub-rule (3) and sub-rule(4) of the rule 5, rule 9, rule 10 clause(c) of sub-rule(1) of the rule 32, clause (b) of sub-rule(1) and clause (c) of sub-rule(2) of rule 46, sub-rule(1) of rule 49, ¹[sub-rule(3) of rule 51, sub-rule(3) of rule 59;] sub-rule(6) of rule 61 and clause(b) of sub-rule(5)of rule 67].]

²[**4B. Qualification of officers appointed to assist the Inspectors-**³[(1)No person shall be appointed as an officer to assist an Inspector, unless:-

(a) (i) he possesses a Degree in Electrical Engineering or its equivalent from a recognised University or Institution; and

(ii) he has been regularly engaged for a period of at least three years in the practice of electrical engineering, of which not less than one year has been spent in an electrical or mechanical engineering workshop or in generation or transmission or distribution of electricity, or in the administration of the Act and these rules, in a position of responsibility;

Provided that the appropriate Government may relax the requirements of experience in case of officers otherwise well qualified;

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(b) (i) he possesses diploma in electrical engineering or its equivalent from a recognised institution; and

(ii) he has been regularly engaged for a period of at least six years in the practice of electrical engineering, of which not less than two years have been spent in an electrical or mechanical engineering workshop or in generation or transmission or distribution of electricity or in the administration of the Act and these rules, in a position of responsibility;]

⁴[(2)The persons appointed under rule 4A shall undergo such training as the appropriate Government may consider it necessary for the purpose and such training shall be completed to the satisfaction of the appropriate Government;]

⁴(3)The appropriate Government may relax requirements of practical experience in case of officers otherwise found suitable but a notification under sub-rule(2)of Rule

1.Ins. vide G.S.R.466, dated 17-8-1991

2.Subs. vide G.S.R.772 dated 20-9-1986

3.Ins. vide G.S.R. 730, dated 30-9-1989

4.Renumbering as sub rule (1) (2) of Rule 4 b and insertion of sub Rule (3) vide G.S.R. No. 730 dated 30.9.1989

Note: Sub Rule (2) before renumbering was clause (e) of Rule 4 b and was inserted vide G.S.R. No. 358 dated 9.5.1987.

4A in case of such officers shall be issued only after they have acquired the experience as required by sub-rule(1)]

5.Entry and Inspection-(1) Any Inspector or any officer appointed to assist an Inspector may enter, inspect and examine any place, carriage or vessel in which he has reason to believe that there is any appliance or apparatus used in the generation, transmission, transformation, conversion, distribution or use of energy and may carry out tests therein;

(2)Every supplier, consumer, owner and occupier shall afford at all times all reasonable facilities to any such Inspector or officer to make such examinations and tests as may be necessary to satisfy himself as to the due observance of the provisions of the Act, the terms of the licence(if any) and these rules.

(3)Every supplier and every owner of a generation station or of a high/extra high voltage installation shall, if required so to do by an Inspector or any officer appointed to assist the inspector and authorised under sub-rule(2) of rule 4-A provide reasonable means for carrying out all tests, prescribed by or under the Act, of the appliances or apparatus used for the supply or use of energy by him as the case may be.

(4) An Inspector, or any officer appointed to assist an Inspector and authorised under sub-rule(2) of rule 4A, may serve an order in the form set out in Annexure IX, upon any supplier, consumer, owner or occupier, calling upon him to comply with any specified rule and the person so served shall thereupon comply with the order within the period named therein, and shall report in writing to the Inspector or the officer serving the order, as the case may be, when the order is complied with;

Provided that, if within the period specified in the aforesaid order an appeal is filed against the order, the appellate authority may suspend its operation pending the decision of the appeal.

6.Appeals- (1)An appeal against an order served under these rules shall lie-

(a)if the order is served by an officer appointed to assist an inspector and authorised under sub-rule(2) of rule 4A, to the inspector;

(b)if the order is served by an inspector, to the Central Government or the State Government, as the case may be.

(2)In the case of an order of an Inspector on an appeal preferred to him under clause(a) of sub-rule(1), a further appeal shall lie to the Central Government or the State Government, as the case may be.

(3)Every appeal made under sub-rule(1)shall be in writing, shall be accompanied by a copy of the order appealed against and shall be presented within 3 months of the date on which such order has been served or delivered or is deemed to have been served or delivered as the case may be

7. Amount of fees -(1)The fees set out in Annexure-II shall be payable in respect of the services therein mentioned where the tests are carried out by comparison with the Government of India Standards referred to in sub-rule(1)of rule2.

(2)The Central Government or the State Government as the case may be, may levy such fees for testing and inspection and generally for the services of Inspectors or any officers appointed to assist the Inspector as it may from time to time by general or special order, direct , and may, if it thinks fit, remit any fee or any portion thereof.

8.Incidence of fees recoverable in the cases of dispute:-Where an Inspector is called in to decide any difference or dispute and where a fee for such service is recoverable, the Inspector shall decide by whom such fee shall be payable.

9.Submission of records:- An Inspector or any officer appointed to assist the Inspector and authorised under sub-rule(2) of rule 4-A may require a supplier or an owner to submit to him for examination any records of tests made in connection with his works and he shall comply with such requisition. Similarly, a supplier or owner may require the Inspector or any officer appointed to assist the Inspector and authorised under sub-rule(2) of rule 4-A to submit to him for examination any records of tests made by the Inspector or any officer appointed to assist the Inspector and authorised under sub-rule(2) of rule 4-A in connection with his works and the Inspector or any officer appointed to assist the Inspector and authorised under sub-rule(2) of rule 4-A shall comply with such requisition.

10.List of consumers:-An Inspector or any officer appointed to assist the Inspector and authorised under sub-rule(2) of rule 4-A may require a supplier to submit to him a list of all persons supplied with energy by him, the addresses at which such energy is supplied, the month of connecting services, the voltage of supply, the connected load, the purpose of supply and the name of contractor carrying out the installation work and the supplier shall comply with such requisition.

CHAPTER III LICENCE

11.Application for licence-(1) Every application for a licence shall be signed by or on behalf of the applicant and addressed to such officer as the State Government may designate in this behalf and it shall be accompanied by-

- (a) six copies, in print, of the draft licence as proposed by the applicant, with the name and address of the applicant and of his agent(if any) printed on the outside of the draft;
- (b) three copies, each signed by the applicant, of maps of the proposed area of supply and of the streets or roads in which the supply of energy is to be compulsory, which shall be so marked or coloured as to define any portion of such area and streets or roads which are under the administrative control of any local authority and shall be on a scale-
 - (i) of not less than 10 centimetres to a kilometre, or
 - (ii) if no such maps are available, of not less than that of the largest scale ordinance maps available, or
 - (iii) on such other scales as may be approved by State Government;
- (c) a list of any local authorities vested with the administration of any portion of the area of supply;
- (d) an approximate statement describing any lands which the applicant proposes to acquire for the purpose of the licence under the provisions of the Land Acquisition Act 1894(1 of 1894);
- (e) an approximate statement of the capital proposed to be expended in

connection with the undertaking and such other particulars as the State Government may require;

- (f) if the applicant is a Company which is registered under any of the enactments relating to Companies for the time being in force in India or is a Corporation by an Act of the Parliament, a copy of the Memorandum and Articles of Association; and
- (g) a treasury receipt for such fee not exceeding fifteen hundred rupees, as the State Government may require, paid into a Government treasury in the State concerned, unless such fee is remitted, wholly or in part, by general or special order of the State Government.

(2) If the application for a licence is rejected or if a licence is revoked under sub-section(2) of section 4 as to the whole or any part of the area of supply, the State Government may at its discretion refund, wholly or in part, the fee referred to in clause(g) of sub-rule(1).

12. Copies of maps and draft licence for public inspection- The applicant shall deposit at his own office and of his agents(if any) and at the office of every local authority invested with the administration of any portion of the proposed area of supply-

- (a) copies of the maps referred in clause(b) of sub-rule(1) of rule 11 for public inspection; and
- (b) a sufficient number of copies of the draft licence to be furnished to all persons applying for them at a price not exceeding twenty-five [¹] paise per copy.

13. Contents of draft licence- The draft licence shall contain the following particulars-

- (a) A short title descriptive of the proposed undertaking together with the address and description of the applicant, or in the case of a firm, the names of all the directors or partners of the firm;
- (b) A Statement of the boundaries of the proposed area of supply;
- (c) If the generating station is situated or is to be situated outside the area of supply or if any intervening area not included in the area of supply is to be crossed, a list of the streets not included in the area of supply along or across which electric supply lines are to be laid down or placed;
- (d) the proposed limits within which and the conditions under which the supply of energy is to be compulsory or permissive, the nature and amount of the supply(if limited) and the like;
- (e) a list of the streets(if any) which are repairable neither by the Central or the State Government nor by a local authority and of the railways and tramways(if any), the soil or pavement of which the applicant seeks powers to open or breakup, and the names of the persons or designations of authorities by whom such streets are repairable or who are for the time being entitled to work such railways or tramways;
- (f) the proposed periods after which the right to purchase is to take effect;

1. The word "naye" omitted vide G.S.R.256, dated 26th March, 1983

- (g) a statement of any special terms of purchase or orders proposed to be made under section 10; and
- (h) any proposed modification of the Schedule to the Act to be made under clause (f) of sub-section (2) of section 3.

14. Form of draft licence- The form of draft licence contained in Annexure-III may, with such variation as the circumstances of each case require, be used for the purposes of rules 11 and 13 and if used, shall be sufficient.

15. Advertisement of application and contents thereof (1)- The applicant shall, within fourteen days from the submission of the application under rule 11, publish notice of his application by public advertisement and such advertisement shall publish such particulars as the State Government may specify.

(2) The advertisement shall be headed by a short title corresponding to that given at the head of the draft licence and shall give the addresses of the offices at which, under rule 12, copies of maps therein referred to may be inspected and the copies of draft licence perused or purchased and shall state that every local authority, company or person, desirous of making any representation with reference to the application to the State Government, may do so by letter addressed to such officer as the State Government may designate in this behalf within three months of the date of issue of the first advertisement.

(3) The advertisement shall be inserted by the applicant in at least two successive issues of such newspapers as the State Government, having regard to its circulation among persons likely to be interested, may direct, and in the absence of any such direction, in at least two successive issues of any newspaper, published within the proposed area of supply or if there is no such newspaper, in any newspaper, published within the State.

(4) The applicant shall send a copy of each of the two successive issues of the newspaper containing the advertisement to such officer as the State Government may designate in this behalf as soon as the second issue has appeared and the State Government shall publish the advertisement at least once in the Official Gazette within six weeks from the date of the first advertisement published under sub-rule (3);

Provided that any failure or delay on the part of the State Government in publishing the advertisement shall not of itself preclude the grant of a licence.

16. Amendment of draft licence:- Any person who desires to have any amendment made in the draft licence shall deliver a statement of the amendment to the applicant and to such officer as the State Government may designate in this behalf within the time allowed under sub-rule (2) of rule 15 for the submission of representations referring to the application.

17. Local enquiries- If any person locally interested objects to the grant of a licence applied for under the Act, the State Government shall, if either the applicant or the objector so desires, cause a local enquiry to be held of which the notice in writing shall be given to both the applicant and the objector.

Provided that the State Government may refuse such an enquiry if in its opinion the objection is of a trifling or vexatious nature.

18. Approval of draft licence:- When the State Government has approved a draft licence, either in its original form or in a modified form, such officer as the State Government may

designate in this behalf shall inform the applicant of such approval and of the form in which it is proposed to grant the licence.

19. Notification of grant of licence- On receiving an intimation in writing from the applicant that he is willing to accept a licence in the form approved by the State Government, the State Government shall publish the licence within two months by a notification in the Official Gazette, together with a statement that it has been granted.

20. Date of commencement of licence- The date of notification under rule 19 shall be deemed to be the date of commencement of the licence.

21. Deposit of maps- When a licence has been granted, three sets of maps showing, as regards such licence, the particulars specified in clause(b) of sub-rule (1) of rule 11 shall be signed and dated to correspond with the date of the notification of the grant of the licence by such officer as the State Government may designate in this behalf. One set of such maps shall be retained as the deposited maps by the said officer and of the remaining two sets, one shall be furnished to the State Electricity Board constituted under section 5 of the Electricity(Supply) Act, 1948, and the other to the licensee.

22 Deposit of printed copies- (1) Every person who is granted a licence, shall within thirty days of the grant thereof-

- (a) have adequate number of copies of the licence printed.
- (b) have adequate number of maps prepared showing the area of supply and the compulsory areas specified in the licence.
- (c) arrange to exhibit a copy of such licence and maps for public inspection at all reasonable times at his head office, his local offices(if any), and at the office of every authority within the area of supply.

(2) Every such licence shall, within the aforesaid period of thirty days supply free of charge one copy of the licence and the relevant maps to every local authority within the area of supply and shall also make necessary arrangements for the sale of printed copies of the licence to all persons applying for the same, at a price not exceeding twenty-five [¹] paise per copy.

23. Application for written consent of State Government in certain cases- If a licensee desires the written consent of the State Government under sub-section(5) of section 12 to enable him to open or break up the soil or pavement of any street(which is repairable neither by the Central or the State Government nor by a local authority), or any railway or tramway, he shall apply for such consent in writing to such officer as the State Government may designate in this behalf and shall describe accurately the street, railway or tramway, which he seeks power to open or break up and the names of the persons or designations of the authorities by whom such street is repairable or who are for the time being entitled to work such railway or tramway, and the extent to which he proposes to open or break up the same.

24. Amendment of licence-(1) If a licensee desires that any alterations or amendments should be made in the terms and conditions of the licence under sub-section(1) of section 4 A, he shall submit a written application to the officer designated by the State Government under rule 11 and shall within fourteen days from the submission of the application publish notice of his application by public advertisement; and the provisions

1. The word "naye" omitted vide G.S.R.256, dated 26th March, 1983

of sub-rules(2), (3) and (4) of rule 15 shall apply to such publication.

(2)The State Government shall within six months of the date of submission of the application either approve of the alterations or amendments in the form proposed by the licensee or in any other modified form which he accepts or rejects them. When the State Government has approved of the alterations or amendments either in the form proposed by the licensee or in any other modified form which he accepts, it shall notify the alterations or amendments so approved, in the Official Gazette.

25.Sale of Plans-Copies of plans or sections such as are referred to in Clause XVI of the Schedule to the Act shall be supplied by the licensee to every applicant at a price not exceeding one rupee per 1000 square centimetres.

26. Preparations and submission of accounts-(1)Every licensee, unless exempted under section 11, shall cause the accounts of his undertaking to be made upto the thirty-first day of March each year.

(2)Such licensee shall prepare and render an annual statement of his accounts in accordance with the provisions of section 11 within a period of six months from the aforesaid date, or such extended period as the State Government may authorise after it is satisfied that the time allowed is insufficient owing to any cause beyond the control of the licensee, and the statement shall be rendered in quadruplicate if the State Government so desires.

(3)The accounts shall be made up in the prescribed forms set out in Annexures IV and V and shall be rendered in Indian currency. All the forms shall be signed by the licensee or his accredited agent or manager.

(4) The State Government may, by special or general order, direct that in addition to the submission of the annual statement of accounts in the forms prescribed in sub-rule(3), a licensee shall submit to the State Government or such other authority as it may appoint in this behalf such additional information as it may require for the purpose.

27.Model conditions of supply-(1) Without prejudice to the powers conferred by section 21 on the State Government in this behalf, the model conditions of supply contained in Annexure VI may, with such variations as the circumstances of each case require be adopted by the licensee for the purpose of sub-section(2) of that section with the previous sanction of the State Government.

(2) The licensee shall always keep in his office an adequate number of printed copies of the sanctioned conditions of supply and shall, on demand, ¹[sell such copies to any applicant at a price fixed, on cost basis, from time to time.]

28.Forms of requisitions-Requisitions under sub-clause (4) of Clause V of sub-clause(5) of Clause VI, as the case may be, of the Schedule to the Act shall be made in the form set out in Annexure VII or Annexure VIII.

CHAPTER IV

GENERAL SAFETY ²[REQUIREMENTS]

29.Construction, installation, protection, operation and maintenance of electric supply lines and apparatus- ³[(1) All electric supply lines and apparatus shall be of

1. Subs. vide G.S.R. 112, dated 1st April, 2000

2.Subs.vide G.S.R.358, dated 9-5-1987

3. Added vide G.S.R. 358, dated 9-5-1987

sufficient ratings for power, insulation and estimated fault current and of sufficient mechanical strength, for the duty which they may be required to perform under the environmental conditions of installation, and shall be constructed, installed, protected, worked and maintained in such a manner as to ensure safety of ¹[human beings, animals and property]

(2) Save as otherwise provided in these rules, the relevant code of practice of the ²[Bureau of Indian Standards] ³[including National Electrical Code] if any may be followed to carry out the purposes of this rule and in the event of any inconsistency, the provisions of these rules shall prevail.

(3) The material and apparatus used shall conform to the relevant specifications of the ²[Bureau of Indian Standards] where such specifications have already been laid down.

30. Service lines and apparatus on consumer's premises- (1) The supplier shall ensure that all electric supply lines, wires, fittings and apparatus belonging to him or under his control, which are on a consumer's premises, are in a safe-condition and in all respects fit for supplying energy and the supplier shall take due precautions to avoid danger arising on such premises from such supply lines, wires, fittings and apparatus.

(2) Service-lines placed by the supplier on the premises of a consumer which are underground or which are accessible shall be so insulated and protected by the supplier as to be secured under all ordinary conditions against electrical, mechanical, chemical or other injury to the insulation.

(3) The consumer shall, as far as circumstances permit, take precautions for the safe custody of the equipment on his premises belonging to the supplier.

(4) The consumer shall also ensure that the installation under his control is maintained in a safe condition.

31. Cut-out on consumer's premises- (1) The supplier shall provide a suitable cut-out in each conductor of every service-line other than an earthed or earthed neutral conductor or the earthed external conductor of a concentric cable within a consumer's premises, in an accessible position. Such cut-out shall be contained within an adequately enclosed fireproof receptacle.

Where more than one consumer is supplied through a common service-line, each such consumer shall be provided with an independent cut-out at the point of junction to the common service.

(2) Every electric supply line other than the earth or earthed neutral conductor of any system or the earthed external conductor of a concentric cable shall be protected by a suitable cut-out by its owner.

⁴(3) ***

32. Identification of earthed and earthed neutral conductors and position of switches and cut-outs therein- Where the conductors include an earthed conductor of a two-wire system or an earthed neutral conductor of a multi-wire system or a conductor which is to

1. Subs. vide G.S.R.45, dated 23-1-1993

2. Subs. vide G.S.R 466 dated 17-8-1991

3. Ins. vide G.S.R.358, dated 9-5-1987

4. Sub-rule (3) omitted vide G.S.R.358, dated 9-5-1987

be connected thereto, the following conditions shall be complied with:-

- (1) An indication of a permanent nature shall be provided by the owner of the earthed or earthed neutral conductor, or the conductor which is to be connected thereto, to enable such conductor to be distinguished from any live conductor. Such indication shall be provided-
 - (a) where the earthed or earthed neutral conductor is the property of the supplier, at or near the point of commencement of supply;
 - (b) where a conductor forming, part of a consumer's system is to be connected to the supplier's earthed or earthed neutral conductor, at the point where such connection is to be made;
 - (c) in all other cases, at a point corresponding to the point of commencement of supply or at such other points as may be approved by an Inspector or any officer appointed to assist the Inspector and authorised under sub-rule(2) of rule 4A.
- (2) No cut-out, link or switch other than a linked switch arranged to operate simultaneously on the earthed or earthed neutral conductor and live conductors shall be inserted or remain inserted in any earthed or earthed neutral conductor of a two wire-system or in any earthed or earthed neutral conductor of a multi-wire system or in any conductor connected thereto with the following exceptions:-
 - (a) A link for testing purposes, or
 - (b) A switch for use in controlling a generator or transformer.

33. Earthed terminal on consumer's premises:- (1) The supplier shall provide and maintain on the consumer's premises for the consumer's use, a suitable earthed terminal in an accessible position at or near the point of commencement of supply as defined under rule 58

Provided that in the case of medium, high or extra-high voltage installation the consumer shall, in addition to the aforementioned earthing arrangement, provide his own earthing system with an independent electrode.

Provided further that the supplier may not provide any earthed terminal in the case of installations already connected to his system on or before the date to be specified by the State Government in this behalf if he is satisfied that the consumer's earthing arrangement is efficient.

(2) The consumer shall take all reasonable precautions to prevent mechanical damage to the earthed terminal and its lead belonging to the supplier.

¹[(3) The supplier may recover from the consumer the cost of installation on the basis of schedule of charges notified in advance and where such schedule of charges is not notified, the procedure prescribed, in sub-rule(5) of rule 82 will apply.]

34. Accessibility of bare conductors:- Where bare conductors are used in a building, the owner of such conductors shall –

- (a) ensure that they are inaccessible;

(b) provide in readily accessible position switches for rendering them dead whenever necessary; and

(c) take such other safety measures as are considered necessary by the Inspector.

35.Danger Notices:-The owner of every medium, high and extra-high voltage installation shall affix permanently in a conspicuous position a danger notice in Hindi or English and the local language of the district, with a sign of skull and bones ¹[of a design as per the relevant ISS No.2551] on-

- (a) every motor, generator, transformer and other electrical plant and equipment together with apparatus used for controlling or regulating the same;
- (b) all supports of high and extra-high voltage overhead lines which can be easily climbed-upon without the aid of ladder or special appliances;

Explanation- Rails, tubular poles, wooden supports, reinforced cement concrete poles without steps, I-sections and channels, shall be deemed as supports which cannot be easily climbed upon for the purposes of this clause;

- (c) luminous tube sign requiring high voltage supply, X-ray and similar high-frequency installations:

Provided that where it is not possible to affix such notices or any generator, motor, transformer or other apparatus, they shall be affixed as near as possible thereto, or the word 'danger' and the voltage of apparatus concerned shall be permanently painted on it

Provided further that where the generator, motor, transformer or other apparatus is within an enclosure one notice affixed to the said enclosure shall be sufficient for the purposes of this rule.

36.Handling of electric supply lines and apparatus:- (1) Before any conductor or apparatus is handled adequate precautions shall be taken, by earthing or other suitable means, to discharge electrically such conductor or apparatus, and any adjacent conductor or apparatus if there is danger therefrom, and to prevent any conductor or apparatus from being accidentally or inadvertently electrically charged when persons are working thereon:

Every person who is working on an electric supply line or apparatus or both shall be provided with tools and devices such as gloves, rubber shoes, safety belts, ladders, earthing devices, helmets, line testers, hand lines and the like for protecting him from mechanical and electrical injury. Such tools and devices shall always be maintained in sound and efficient working conditions:

²[***]

(2) No person shall work on any live electric supply line or apparatus and no person shall assist such person on such work, unless he is authorised in that behalf, and takes the safety measures approved by the Inspector.

(3) Every telecommunication line on supports carrying a high or extra-high voltage line shall, for the purpose of working thereon, be deemed to be a high voltage line.

1. Added vide G.S.R.512, dated 16-7-1983

2. Proviso omitted vide G.S.R.358 dated 9-5-1987

37. Supply to vehicles, cranes, etc. - Every person owning a vehicle, travelling crane, or the like to which energy is supplied from an external source shall ensure that it is efficiently controlled by a suitable switch enabling all voltage to be cut off in one operation and, where such vehicle, travelling crane or the like runs on metal rails, the owner shall ensure that the rails are electrically continuous and earthed.

38. Cables for portable or transportable apparatus (1) - Flexible cables shall not be used for portable or transportable motors, generators, transformer rectifiers, electric drills, electric sprayers, welding sets or any other portable or transportable apparatus unless they are heavily insulated and adequately protected from mechanical injury.

(2) Where the protection is by means of metallic covering the covering shall be in metallic connection with the frame of any such apparatus and earth.

(3) The cables shall be three core type and four core type for portable and transportable apparatus working on single phase and three phase supply respectively and the wire meant to be used for ground connection shall be easily identifiable.

39. Cables protected by bituminous materials- (a) Where the supplier or the owner has brought into use an electric supply line (other than an overhead line) which is not completely enclosed in a continuous metallic covering connected with earth and is insulated or protected in situ by composition or material of a bituminous character-

- (i) any pipe, conduit, or the like into which such electric supply line may have been drawn or placed shall, unless other arrangements are approved by the Inspector in any particular case, be effectively sealed at its point of entry into any street box so as to prevent any flow of gas to or from the street box; and
- (ii) such electric supply line shall be periodically inspected and tested where accessible, and the result of each such inspection and test shall be duly recorded by the supplier or the owner.

(b) It shall not be permissible for the supplier or the owner after the coming into force of these rules, to bring into use any further electric supply line as aforesaid which is insulated or protected in situ by any composition or material known to be liable to produce noxious or explosive gases on excessive heating.

40. Street boxes:- (1) Street boxes shall not contain gas pipes, and precautions shall be taken to prevent, as far as reasonably possible, any influx of water or gas.

(2) Where electric supply lines forming part of different systems pass through the same street box, they shall be readily distinguishable from one another and all electric supply lines at high or extra-high voltage in street boxes shall be adequately supported and protected so as to prevent risk of damage to or danger from adjacent electric supply lines.

(3) All street boxes shall be regularly inspected for the purpose of detecting the presence of gas and if any influx or accumulation is discovered, the owner shall give immediate notice to any authority or company who have gas mains in the neighbourhood of the street box and in cases where a street box is large enough to admit the entrance of a person after the electric supply lines or apparatus therein have been placed in position, ample provision shall be made-

- (a) to ensure that any gas which may by accident have obtained access to the box shall escape before a person is allowed to enter; and
- (b) for the prevention of danger from sparking.

(4) The owners of all street boxes or pillars containing circuits or apparatus shall ensure that their covers and doors are so provided that they can be opened only by means of a key or a special appliance.

41. Distinction of different circuits:- The owner of every generating station, sub-station, junction-box or pillar in which there are any circuits or apparatus, whether intended for operation at different voltages or at the same voltage, shall ensure by means of indication of a permanent nature that the respective circuits are readily distinguishable from one another.

¹**[41-A Distinction of the installations having more than one feed -** The owner of the every installation including sub-station, double pole structure, four pole structure or any other structure having more than one feed, shall ensure by means of indication of a permanent nature, that the installation is readily distinguishable from other installations]

42. Accidental Charge- The owners of all circuits and apparatus shall so arrange them that there shall be no danger of any part thereof becoming accidentally charged to any voltage beyond the limits of voltage for which they are intended.

Where A.C. and D.C. circuits are installed on the same support they shall be so arranged and protected that they shall not come into contact with each other when live.

43. Provisions applicable to protective equipment- (1) Fire buckets filled with clean dry sand and ready for immediate use for extinguishing fires, in addition to fire extinguishers suitable for dealing with electric fires, shall be conspicuously marked and kept in all generating stations, enclosed sub-stations and switch stations in convenient situation. The fire extinguishers shall be tested for satisfactory operation at least once a year and record of such tests shall be maintained.

(2) First-aid boxes or cupboards, conspicuously marked and equipped with such contents as the State Government may specify, shall be provided and maintained in every generating station, enclosed sub-station and enclosed switch station so as to be readily accessible during all working hours. All such boxes and cupboards shall, except in the case of unattended sub-stations and switch stations, be kept in charge of responsible persons who are trained in first-aid treatment and one of such person shall be available during working hours.

²[(3) Two or more gas masks shall be provided conspicuously and installed and maintained in accessible places in every generating station with capacity of 5 MW and above and enclosed sub-station with transformation capacity of 5 MVA and above for use in the event of fire or smoke;

Provided that where more than one generator with capacity of 5 MW and above is installed in a power station, each generator would be provided with at least two separate gas masks in accessible and conspicuous position;

Provided further that adequate number of gas masks would be provided by the Owner

1. Ins. vide G.S.R.529, dated 19-7-1986

2. Ins. vide G.S.R.466, dated 17-8-1991

of every generating station and enclosed sub-station with capacity less than 5 MW and 5 MVA respectively, if so desired by the Inspector]

44. Instructions for restoration of persons suffering from electric shock-(1) Instructions, in English or Hindi and the local language of the District and where Hindi is the local language, in English and Hindi for the restoration of persons suffering from electric shock, shall be affixed by the owner in a conspicuous place in every generating station, enclosed sub-station, enclosed switch-station and in every factory as defined in clause (m) of Section 2 of the Factories Act, 1948 (63 of 1948) in which electricity is used and in such other premises where electricity is used as the Inspector or any officer appointed to assist the Inspector may, by notice in writing served on the owner, direct.

(2) Copies of the instructions shall be supplied on demand by an officer or officers appointed by the Central or the State Government in this behalf at a price to be fixed by the Central or the State Government.

(3) The owner of every generating station, enclosed sub-station, enclosed switch-station and every factory or other premises to which this rule applies, shall ensure that all authorised persons employed by him are acquainted with and are competent to apply the instructions referred to in sub-rule (1).

(4) In every manned high voltage or extra-high voltage generating station, sub-station or switch station, an artificial respirator shall be provided and kept in good working condition.

¹**[44A Intimation of Accident-**If any accident occurs in connection with the generation, transmission, supply or use of energy in or in connection with, any part of the electric supply lines or other works of any person and the accident results in or is likely to have resulted in loss of human or animal life or in any injury to a human being or an animal, such person or any authorised person of the State Electricity Board/Supplier, not below the rank of a Junior Engineer or equivalent shall send to the Inspector a telegraphic report within 24 hours of the knowledge of the occurrence of the fatal accident and a written report in the form set out in Annexure XIII within 48 hours of the knowledge of occurrence of fatal and all other accidents. Where practicable a telephonic message should also be given to the Inspector immediately the accident comes to the knowledge of the authorised officer of the State Electricity Board/Supplier or other person concerned.]

45. Precautions to be adopted by consumers, Owners, ²[occupiers], electrical contractors, electrical workmen and suppliers-(1) No electrical installation work, including additions, alterations, repairs and adjustments to existing installations, except such replacement of lamps, fans, fuses, switches, low voltage domestic appliances and fittings as in no way alters its capacity or character, shall be carried out upon the premises of or on behalf of any ³[consumer, supplier, owner or occupier] for the purpose of supply to such ³[consumer, supplier, owner or occupier] except by an electrical contractor licensed in this behalf by the State Government and under the direct supervision of a person holding a certificate of competency and by a person holding a permit issued or recognised by the State Government.

1. Subs. vide G.S.R.1049, dated 9-11-1985

2. Ins. vide G.S.R.529, dated 19-7-1986

3. Subs. vide G.S.R.45, dated 23-1-1993

Provided that in the case of works executed for or on behalf of the Central Government and in the case of installations in mines, oil fields and railways, the Central Government and in other cases the State Government, may, by notification in the Official Gazette, exempt on such conditions as it may impose, any such work described therein either generally or in the case of any specified class of consumers, ¹[suppliers], owners or occupiers from so much of this sub-rule as requires such work to be carried out by an electrical contractor licensed by the State Government in this behalf.

²[(2)No electrical installation work which has been carried out in contravention of sub-rule(1) shall either be energised or connected to the works of any supplier]

³[***]

46.Periodical inspection and testing of ⁴[*] installation-**(1)(a)Where an installation is already connected to the supply system of the supplier, every such installation shall be periodically inspected and tested at intervals not exceeding five years either by the Inspector or any officer appointed to assist the Inspector or by the supplier as may be directed by the State Government in this behalf or in the case of installations belonging to, or under the control of the Central Government, and in the case of installation in mines, oilfields and railways by the Central Government.

⁵[(aa) the periodical inspection and testing of high voltage and extra high voltage installations belonging to supplier, shall also be carried out at intervals not exceeding five years by the inspector or any officer appointed to assist the inspector.]

(b)Where the supplier is directed by the Central or the State Government as the case may be to inspect and test the installation he shall report on the condition of the installation to the consumer concerned in a form approved by the Inspector and shall submit a copy of such report to the Inspector or to any officer appointed to assist the Inspector and authorised under sub-rule(2) of rule 4A.

(c)Subject to the approval of the Inspector, the forms of inspection report contained in Annexure IX-A may, with such variations as the circumstances of each case require, be used for the purposes of this sub-rule.

(2)(a)The fees for such inspection and test shall be determined by the Central or the State Government, as the case may be, in the case of each class of consumers and shall be payable by the consumer in advance.

(b)In the event of the failure of any consumer to pay the fees on or before the date specified in the fee-notice, supply to the installation of such consumer shall be liable to be disconnected under the direction of the Inspector. Such disconnection, however, shall not be made by the supplier without giving to the consumer seven clear days notice in writing of his intention so to do.

(c)In the event of the failure of the owner of any installation to rectify the defects in his installation pointed out by the Inspector or by any officer appointed to assist him and authorised under sub-rule(2) of rule 4-A in the form set out in Annexure IX and within the time indicated therein, such installation shall be liable to be disconnected ⁶[under the directions of the Inspector] after serving the owner of such installation with a notice.

Provided that the installation shall not be disconnected in case an appeal is made under rule 6 and the appellate authority has stayed the orders of disconnection;

1.Subs. vide G.S.R.45 dated 23-1-1993

2.Subs. vide G.S.R.529, dated 19-7-1986

3.Deleted vide G.S.R. No. 844 dated 7-9-1985

4. The words "consumers" omitted vide G.S.R. 468 dated 25th November, 2000

5. Ins. vide G.S.R. 468 dated 25th November, 2000

6. Added vide G.S.R. No. 29 dated 14-1-1984

Provided further that the time indicated in the notice shall not be less than 48 hours in any case;

Provided also that nothing contained in this clause shall have any effect on the application of rule 49.

(3) Notwithstanding the provisions of this rule, the consumer shall at all times be solely responsible for the maintenance of his installation in such condition as to be free from danger.

CHAPTER V

GENERAL CONDITIONS RELATING TO SUPPLY AND USE OF ENERGY

47. Testing of consumer's installation-(1) Upon receipt of an application for a new or additional supply of energy and before connecting the supply or reconnecting the same after a period of six months, the supplier shall inspect and test the applicant's installation.

The supplier shall maintain a record of test results obtained at each supply point to a consumer, in a form to be approved by the Inspector.

(2) If as a result of such inspection and test, the supplier is satisfied that the installation is likely to constitute danger, he shall serve on the applicant a notice in writing requiring him to make such modifications as are necessary to render the installation safe. The supplier may refuse to connect or reconnect the supply until the required modifications have been completed and he has been notified by the applicant.

¹**[47A Installation and Testing of Generating Units-**Where any consumer or occupier installs a generating plant, he shall give a thirty days' notice of his intention to commission the plant to the supplier as well as the Inspector;

Provided that no consumer or occupier shall commission his generating plant of a capacity exceeding 10 KW without the approval in writing of the Inspector]

48. Precautions against leakage before connection -²[(1) The supplier shall not connect with his works the installation or apparatus on the premises of any applicant for supply unless he is reasonably satisfied that the connection will not at the time of making the connection cause a leakage from that installation or apparatus of a magnitude detrimental to safety. Compliance with this rule shall be checked by measuring the installation resistance as provided below:

- ³[(i) All the electrical equipments shall have the "IR" values as stipulated in the relevant Indian Standards.
- (ii) At a pressure of 500 V DC applied between each live conductor and earth for a period of one minute the insulation resistance of low voltage and medium voltage equipments shall be at least 1 Mega ohm or as specified in the relevant Indian Standard.
- (iii) At a pressure of 2.5 KV DC applied between each live conductor and earth for a period of one minute, the insulation resistance of high voltage equipments shall be at least 5 Mega ohm or as specified by in the relevant Indian Standard.]

1. Ins.vide G.S.R.218, dated 29-4-1995

2. Subs.vide G.S.R.529, dated 19-7-1986

3. Subs. vide G.S.R.468, dated 25th November, 2000

(2) If the supplier declines to make a connection under the provisions of sub-rule(1) he shall serve upon the applicant a notice in writing stating his reason for so declining.

49. Leakage on consumer's premises - (1) If the Inspector or any officer appointed to assist the Inspector and authorised under sub-rule(2) of rule 4A or the supplier has reason to believe that there is in the system of a consumer leakage which is likely to affect injuriously the use of energy by the supplier or by other persons, or which is likely to cause danger, he may give the consumer reasonable notice in writing that he desires to inspect and test the consumer's installation.

(2) If on such notice being given-

(a) The consumer does not give all reasonable facilities for inspection and testing of his installation, or

¹[(b) When an insulation resistance of the consumer's insulation is so low as to prevent safe use of energy the supplier may, and if directed so to do by the Inspector shall discontinue the supply of energy to the installation but only after giving to the consumer 48 hours notice in writing of disconnection of supply and shall not recommence the supply until he or the Inspector is satisfied that the cause of the leakage has been removed].

²[**50. Supply and use of energy**-(1) The energy shall not be supplied, transformed, converted or used or continued to be supplied, transformed, converted or used unless provisions as set out below are observed:-

(a) The following controls of requisite capacity to carry and break the current ³[are placed] after the point of commencement of supply as defined in rule 58 so as to be readily accessible and capable of being easily operated to completely isolate the supply to the installation, such equipment being in addition to any equipment installed for controlling individual circuits or apparatus:-

(i) a linked switch with fuse(s) or a circuit breaker by low and medium voltage consumers.

(ii) a linked switch with fuse(s) or a circuit breaker by HV consumers having aggregate installed transformer/apparatus capacity up to 1000 KVA to be supplied at voltage upto 11 KV and 2500 KVA at higher voltages (above 11 KV and not exceeding 33KV).

(iii) a circuit breaker by HV consumers having an aggregate installed transformer/apparatus capacity above 1000 KVA and supplied at 11 KV and above 2500 KVA supplied at higher voltages (above 11 KV and not exceeding 33KV)

(iv) a circuit breaker by EHV consumer:

Provided that where the point of commencement of supply and the consumer apparatus are near each other, one linked switch with fuse(s) or circuit breaker near the point of commencement of supply as required by this clause shall be considered sufficient for the purpose of this Rule.

1.Subs. vide G.S.R.529, dated 19-7-1986

2.Subs. vide G.S.R.117, dated 8-2-1986

3.Subs.vide G.S.R.218, dated 29-4-1995

(b) In case of every transformer the following shall be provided:-

(i) On primary side for transformers a linked switch with fuse(s) or circuit breaker of adequate capacity.

Provided that the linked switch on the primary side of the transformer may be of such capacity as to carry the full load current and to break only the magnetising current of the transformer.

¹[Provided further that for all transformers:-

(A) having a capacity 5000 KVA and above and installed before the commencement of the Indian Electricity (Amendment – 1) Rules, 2000 and

(B) having a capacity of 1000 KVA and above and installed before the commencement of the Indian Electricity (Amendment – 1) Rules, 2000; a circuit breaker shall be provided.]

Provided further that the provision of linked switch on the primary side of the transformer shall not apply to the unit auxiliary transformer of the generator.

² [(ii) In respect of all transformers installed on or after the commencement of the Indian Electricity (Amendment-1) Rules, 2000, on the secondary side of all transformers transforming HV to EHV, MV or LV; a circuit breaker of adequate rating shall be installed:

Provided that for suppliers' transformers of capacity upto 630 KVA, a linked switch with fuse or circuit breaker of adequate rating shall be installed on secondary side.]

(c) Except in the case of composite control gear designed as a unit distinct circuit is protected against excess energy by means of suitable cut-out or a circuit breaker of adequate breaking capacity suitably located and so constructed as to prevent danger from overheating, arcing or scattering of hot metal when it comes into operation and to permit for ready renewal of the fusible metal of the cut-out without danger;

(d) The supply of energy of each motor or a group of motors or other apparatus meant for operating one particular machine is controlled by a suitable linked switch or a circuit breaker or an emergency tripping device with manual reset of requisite capacity placed in such a position as to be adjacent to the motor or a group of motors or other apparatus readily accessible to and easily operated by the person incharge and so connected in the circuit that by its means all supply of energy can be cut off from the motor or group of motors or apparatus from any regulating switch, resistance of other device associated therewith;

(e) All insulating materials are chosen with special regard to the circumstances of its proposed use and their mechanical strength is sufficient for its purpose and so far as is practicable of such a character or so protected as to maintain adequately its insulating property under all working conditions in respect of temperature and moisture; and

(f) Adequate precautions shall be taken to ensure that no live parts are so exposed as to cause danger.

(2) Where energy is being supplied, transformed, converted or used the ³[consumer, supplier or the owner] of the concerned installation shall be responsible for the continuous observance of the provisions of sub-rule(1) in respect of his installations.

1. Subs. vide G.S.R.112, dated 1st April, 2000

2. Subs. vide G.S.R.112, dated 1st April, 2000

3. Subs. vide G.S.R.218, dated 29-4-1995

(3) Every consumer shall use all reasonable means to ensure that where energy is supplied by a supplier no person other than the supplier shall interfere with service lines and apparatus placed by the supplier on the premises of the consumer.]

¹[50A. **Additional provisions for supply and use of energy in multi-storeyed building (more than 15 metres in height)**-(1) Before making an application for commencement of supply or recommencement of supply after an installation has been disconnected for a period of six months or more, the owner/occupier of a multi-storeyed building shall give not less than 30 days notice in writing to the Inspector together with particulars. The supply of energy shall not be commenced or recommenced within this period, without the approval or otherwise in writing of the Inspector.

(2) The supplier/owner of the installation shall provide at the point of commencement of supply a suitable isolating device with cut-out or breaker to operate on all phases except neutral in the 3 phase 4 wire circuit and fixed in a conspicuous position at not more than 2.75 metres above the ground so as to completely isolate the supply to the building in case of emergency.

(3) The owner/occupier of a multi-storeyed building shall ensure that electrical installations/works inside the building are carried out and maintained in such a manner as to prevent danger due to shock and fire hazards, and the installation is carried out in accordance with the relevant codes of practices.

(4) No other service pipes shall be taken along the ducts provided for laying power cables. All ducts provided for power cables and other services shall be provided with fire-barrier at each floor crossing.]

51. Provisions applicable to medium, high or extra-high voltage installations-The following provisions shall be observed where energy at medium, high or extra-high voltage is supplied, converted, transformed or used:

(1)(a) All conductors (other than those of overhead lines) shall be completely enclosed in mechanically strong metal casing or metallic covering which is electrically and mechanically continuous and adequately protected against mechanical damage unless the said conductors are accessible only to an authorised person or are installed and protected to the satisfaction of the Inspector so as to prevent danger:

²[Provided that non-metallic conduits conforming to the relevant Indian Standard Specifications may be used for medium voltage installations, subject to such conditions as the Inspector or Officer appointed to assist an Inspector may think fit to impose.]

³[(b) All metal works, enclosing, supporting or associated with the installation, other than that designed to serve as a conductor shall be connected with an earthing system as per standards laid down in the Indian Standards in this regard and also in accordance with rule 61(4)]

(c) Every switchboard shall comply with the following provisions, namely:-

(i) a clear space of not less than 1 metre in width shall be provided in front of the switchboard;

1. Ins. vide G.S.R.358, dated 9-5-1987

2. Subs. vide G.S.R.336, dated 23-4-1988

3. Subs. vide G.S.R.358, dated 9-5-1987

(ii) If there are any attachments or bare connections at the back of the switchboard, the space (if any) behind the switchboard shall be either less than 20 centimetres or more than 75 centimetres in width, measured from the farthest outstanding part of any attachment or conductor;

(iii) If the space behind the switchboard exceeds 75 centimetres in width, there shall be a passage-way from either end of the switchboard, clear to a height of 1.8 metres.

¹[(d) In case of installations provided in premises where inflammable materials including gases and /or chemicals are produced, handled or stored, the electrical installations, equipment and apparatus shall comply with the requirements of flame proof, dust tight, totally enclosed or any other suitable type of electrical fittings depending upon the hazardous zones as per the relevant Indian Standard Specification.]

²[(2) Where an application has been made to a supplier for supply of energy to any installation, he shall not commence the supply or where the supply has been discontinued for a period of one year and above, recommence the supply unless he is satisfied that the consumer has complied with, in all respects the conditions of supply set out in sub-rule(1) of this rule, rules 50, 63 and 64]

(3) Where a supplier proposes to supply or use energy at a medium voltage or to recommence supply after it has been discontinued for a period of six months, he, shall, before connecting or reconnecting the supply, give notice in writing of such intention to the Inspector ³[or any officer of specified rank and class appointed to assist the Inspector]

⁴[(4) If at any time after connecting the supply, the supplier is satisfied that any provision of the sub-rule(1) of this rule or of rules 50 and 64, is not being observed he shall give notice of the same in writing to the consumer and the Inspector, specifying how the provisions has not been observed and to rectify such defects in a reasonable time and if the consumer fails to rectify such defects pointed out, he may discontinue the supply after giving the consumer a reasonable opportunity of being heard and recording reasons in writing, unless the Inspector directs otherwise. The supply shall be discontinued only on written orders of an officer duly notified by the supplier in this behalf. The supply shall be restored with all possible speed after such defects are rectified by the consumer to the satisfaction of the supplier.]

52. Appeal to Inspector in regard to defects-(1) If any applicant for a supply or a consumer is dissatisfied with the action of the supplier in declining to commence, to continue or to recommence the supply of energy to his premises on the grounds that the installation is defective or is likely to constitute danger, he may appeal to the Inspector to test the installation and the supplier shall not, if the Inspector or under his orders, any other officer appointed to assist the Inspector, is satisfied that the installation is free from the defect or danger complained of, be entitled to refuse supply to the consumer on the grounds aforesaid, and shall, within twenty-four hours after the receipt of such intimation from the Inspector, commence, continue or recommence the supply of energy.

1. Ins. vide G.S.R. 529, dated 19-7-1986

2. Subs. vide G.S.R. 256, dated 26-3-1983

3. Ins. vide G.S.R. 466, dated 17-8-1991

4. Subs. vide G.S.R. 732, dated 3-8-1985

(2) Any test for which application has been made under the provision of sub-rule(1) shall be carried out within seven days after the receipt of such application.

(3) This rule shall be endorsed on every notice given under the provisions of rules 47,48 and 49.

53. Cost of inspection and test of consumer's installation - (1) The cost of the first inspection and test of consumer's installation carried out in pursuance of the provisions of rule 47 shall be borne by the supplier and the cost of every subsequent inspection and test shall be borne by the consumer, unless in the appeal under rule 52 the Inspector directs otherwise.

(2) The cost of any inspection and test made by the Inspector or any officer appointed to assist the Inspector, at the request of the consumer or other interested party, shall be borne by the consumer or other interested party, unless the Inspector directs otherwise.

(3) The cost of each and every such inspection and test by whomsoever borne shall be calculated in accordance with the scale specified by the Central or the State Government as the case may be in this behalf.

54. Declared voltage of supply to consumer- Except with the written consent of the consumer or with the previous sanction of the State Government, a supplier shall not permit the voltage at the point of commencement of supply as defined under rule 58 to vary from the declared voltage:

- (i) in the case of low or medium voltage, by more than 6 per cent, or;
- (ii) in the case of high voltage, by more than 6 per cent on the higher side or by more than 9 percent on the lower side, or;
- (iii) in the case of extra-high voltage, by more than 10 per cent on the higher side or by more than 12.5 per cent on the lower side.

55. Declared frequency of supply to consumer:- Except with the written consent of the consumer or with the previous sanction of the State Government, a supplier shall not permit the frequency of an alternating current supply to vary from the declared frequency by more than 3 percent.

56. Sealing of meters and cut-outs- (1) A supplier may affix one or more seals to any cut-out and to any meter, maximum demand indicator, or other apparatus placed upon a consumer's premises in accordance with section 26, and no person other than the supplier shall break any such seal.

(2) The consumer shall use all reasonable means in his power to ensure that no such seal is broken otherwise than by the supplier.

(3) The word 'supplier' shall for the purpose of this rule include a State Government when any meter, maximum demand indicator or other apparatus is placed upon a consumer's premises by such Government.

57. Meters, maximum demand indicators and other apparatus on consumer's premises-

(1) Any meter or maximum demand indicator or other apparatus placed upon a

consumer's premises in accordance with section 26 shall be of appropriate capacity and shall be deemed to be correct if its limits of error are within the limits specified in the relevant Indian Standard Specification and where no such specification exist, the limits of error do not exceed 3 per cent above or below absolute accuracy at all loads in excess of one tenth of full load and up to full load.

¹[Provided that for extra high voltage consumers the limit of error shall be ± 1 percent]

(2) No meter shall register at no load.

(3) Every supplier shall provide and maintain in proper condition such suitable apparatus as may be prescribed or approved by the Inspector for the examination, testing and regulation of meters used or intended to be used in connection with the supply of energy.

Provided that the supplier may with the approval of the Inspector and shall, if required by the Inspector, enter into a joint arrangement with any other supplier for the purpose aforesaid.

(4) Every supplier shall examine, test and regulate all meters, maximum demand indicators and other apparatus for ascertaining the amount of energy supplied before their first installation at the consumer's premises and at such other intervals as may be directed by the State Government in this behalf.

(5) Every supplier shall maintain a register of meters showing the date of the last test, the error recorded at the time of the test, the limit of accuracy after adjustment and final test, the date of installation, withdrawal, reinstallation, etc., for the examination of the Inspector or his authorised representative.

²[(6) Where the supplier has failed to examine, test and regulate the meters and keep records thereof as aforesaid, the Inspector may cause such meters to be tested and sealed at the cost of the owner of the meters in case these are found defective.]

³[**58. Point of commencement of supply-** The point of commencement of supply of energy to a consumer shall be deemed to be the point at the incoming terminal of the cut-outs installed by the consumer under rule 50]

59. Precautions against failure of supply, Notice of failures: (1) The layout of the electric supply lines of the supplier for the supply of energy throughout his area of supply shall under normal working conditions be sectionalised and so arranged, and provided with cut-outs or circuit-breakers so located, as to restrict within reasonable limits the extent of the portion of the system affected by any failure of supply.

(2) The supplier shall take all reasonable precautions to avoid any accidental interruptions of supply, and also to avoid danger to the public or to any employee or authorised person when engaged on any operation during and in connection with the installation, extension, replacement, repair and maintenance of any works.

(3) The supplier shall send to the Inspector ⁴[or any officer of a specified rank and class appointed to assist the Inspector] notice of failure of supply of such kind as the Inspector ⁴[or any officer of specified rank and class to assist the Inspector] may from time to time require to be notified to him, and such notice shall be sent by the earliest practicable post

1. Added vide G.S.R. 218, dated 29-4-1995

2. Added vide G.S.R. 844, dated 7-9-1985

3. Subs. vide G.S.R. No. 45, dated 23-1-1993

4. Ins. vide G.S.R. 466, dated 17-8-1991

after the failure occurs or after the failure becomes known to the supplier and shall be in such form and contain such particulars as Inspector may from time to time specify.

¹[(4) For the purpose of testing or for any other purpose connected with the efficient working of the undertaking, the supply of energy may be discontinued by the supplier for such period as may be necessary, subject (except in cases of emergency) to not less than 24 hours notice being given by the supplier to all consumers likely to be affected by such discontinuance:

Provided that the supply of energy shall be discontinued during such hours as are likely to interfere the least with the use of energy by consumers and the energy shall not be discontinued if the Inspector so directs.]

CHAPTER VI ELECTRIC SUPPLY LINES, SYSTEMS AND APPARATUS FOR LOW AND MEDIUM VOLTAGES

60. Test for resistance of insulation – (1) Where any electric supply line for use or low at medium voltage has been disconnected from a system for the purpose of addition, alteration or repair, such electric supply line shall not be reconnected to the system until the supplier or the owner has applied the test prescribed under rule 48.

(2) The provision of sub-rule (1) shall not apply to overhead lines except, overhead insulated cables unless the Inspector otherwise directs in any particular case.

61. Connection with earth. – (1) The following provisions shall apply to the connection with earth of systems at low voltage in cases where the voltage normally exceeds 125 volts and of systems at medium voltage:-

- ²[(a) Neutral conductor of a 3 phase, 4 wire system and the middle conductor of a 2 phase, 3-wire system shall be earthed by not less than two separate and distinct connections with a minimum of two different earth electrodes or such large number as may be necessary to bring the earth resistance to a satisfactory value both at the generating station and at the sub-station. The earth electrodes so provided, may be inter-connected to reduce earth resistance. It may also be earthed at one or more points along the distribution system or service line in addition to any connection with earth which may be at the consumer's premises.]
- (b) In the case of a system comprising electric supply lines having concentric cables, the external conductor of such cables shall be earthed by two separate and distinct connections with earth.
- (c) The connection with earth may include a link by means of which the connection may be temporarily interrupted for the purpose of testing or for locating a fault.

1. Subs. vide G.S.R. 732, dated 3-8-1985.

2. Subs. vide G.S.R. 1051, dated 9-11-1985

- (d) (i) In a direct current three wire system the middle conductor shall be earthed at the generating station only, and the current from the middle conductor to earth shall be continuously recorded by means of a recording ammeter, and if any time the current exceeds one-thousandth part of the maximum supply-current immediate steps shall be taken to improve the insulation of the system.
 - (ii) Where the middle conductor is earthed by means of a circuit-breaker with a resistance connected in parallel, the resistance shall not exceed 10 Ohms and on the opening of the circuit-breaker, immediate steps shall be taken to improve the insulation of the system, and the circuit-breaker shall be reclosed as soon as possible.
 - (iii) The resistance shall be used only as a protection for the ammeter in case of earths on the system and until such earths are removed. Immediate steps shall be taken to locate and remove the earth.
- (e) In the case of an alternating current system, there shall not be inserted in the connection with earth any impedance (other than that required solely for the operation of switch-gear or instruments), cut-out or circuit-breaker, and the result of any test made to ascertain whether the current (if any) passing through the connection with earth is normal, shall be duly recorded by the supplier.
- (f) No person shall make connection with earth by the aid of, nor shall he keep it in contact with, any water main not belonging to him except with the consent of the owner thereof and of the Inspector.
- (g) Alternating current systems which are connected with earth as aforesaid may be electrically interconnected:

Provided that each connection with earth is bonded to the metal sheathing and metallic armouring (if any) of the electric supply lines concerned.

(2) The frame of every generator, stationary motor, portable motor, and the metallic parts(not intended as conductors) of all transformers and any other apparatus used for regulating or controlling energy and all medium voltage energy consuming apparatus shall be earthed by the owner by two separate and distinct connections with earth.

¹[(3) All metal casings or metallic coverings containing or protecting any electric supply-line or apparatus shall be connected with earth and shall be so joined and connected across all junction boxes and other openings as to make good mechanical and electrical connection throughout their whole length;

Provided that where the supply is at low voltage, this sub-rule shall not apply to wall tubes or to brackets, electroliers, switches, ceiling fans or other fittings(other than portable hand lamps and portable and transportable apparatus)unless provided with earth terminal and to class-II apparatus/appliances;

Provided further that where the supply is at low voltage and where the installations are either new or renovated all plug sockets shall be of the three-pin type, and the third pin shall be permanently and efficiently earthed.

Explanation-The words “Class-II apparatus/appliance” will have the same meaning as assigned to these words in the relevant ISS]

¹[(4)All earthing system shall -

- (a) consist of equipotential bonding conductors capable of carrying the prospective earth fault current and a group of pipe/rod/plate electrodes for dissipating the current to the general mass of earth without exceeding the allowable temperature limits as per relevant Indian Standards in order to maintain all non-current carrying metal works reasonably at earth potential and to avoid dangerous contact potentials being developed on such metal works;
- (b) Limit earth resistance sufficiently low to permit adequate fault current for the operation of protective devices in time and to reduce neutral shifting;
- (c) be mechanically strong, withstand corrosion and retain electrical continuity during the life of the installation. All earthing systems shall be tested to ensure efficient earthing, before the electric supply lines or apparatus are energised.]

(5) All earthing systems belonging to the supplier shall in addition, be tested for resistance on dry day during the dry season not less than once every two years.

(6) A record of every earth test made and the result thereof shall be kept by the supplier for a period of not less than two years after the day of testing and shall be available to the Inspector or any officer appointed to assist the Inspector and authorised under sub-rule(2) of rule 4-A when required.

²[**61. A. Earth leakage protective device:-** The supply of Energy to every electrical installation other than low voltage installation below 5 KW and those low voltage installations which do not attract provisions of section 30 of the Indian Electricity Act,1910, shall be controlled by an earth leakage protective device so as to disconnect the supply instantly on the occurrence of earth fault or leakage of current:

Provided that the above shall not apply to overhead supply lines having protective devices which are effectively bonded to the neutral of supply transformers and conforming to rule 91 of I.E.Rules,1956.]

62. Systems at medium voltage- Where a medium voltage supply system is employed, the voltage between earth and any conductor forming part of the same system shall not, under normal conditions, exceed low voltage.

1. Subs.vide G.S.R.358, dated 9-5-1987

2. Ins.vide G.S.R.844, dated 7-9-1985

CHAPTER VII

ELECTRIC SUPPLY LINES, SYSTEMS AND APPARATUS FOR HIGH AND EXTRA-HIGH VOLTAGES

63. Approval by Inspector- (1) Before making an application to the Inspector for permission ¹[to commence or recommence supply after an installation has been disconnected for one year and above] at high or extra-high voltage to any person, the supplier shall ensure that the high or extra-high voltage electric supply lines or apparatus belonging to him are placed in position, properly joined and duly completed and examined. The supply of energy shall not be commenced by the supplier unless and until the Inspector is satisfied that the provisions of rules 65 to 69 both inclusive have been complied with and the approval in writing of the Inspector has been obtained by him:

Provided that the supplier may energise the aforesaid electric supply lines or apparatus for the purpose of tests specified in rule 65.

(2) The owner of any high or extra-high voltage installation shall, before making application to the Inspector for approval of his installation or additions thereto, test every high or extra-high voltage circuit or additions thereto, other than an overhead line, and satisfy himself that they withstand the application of the testing voltage set out in sub-rule(1) of rule 65 and shall duly record the results of such tests and forward them to the Inspector:

Provided that an Inspector may direct such owner to carry out such tests as he deems necessary or, if he thinks fit, accept the manufacturer's certified tests in respect of any particular apparatus in place of the tests required by this sub-rule.

(3) The owner of any high or extra-high voltage installation who makes any additions or alterations to his installation shall not connect to the supply his apparatus or electric supply lines, comprising the said alterations or additions unless and until such alterations or additions have been approved in writing by the Inspector.

²[**64. Use of energy at high and extra-high voltage-** (1) The Inspector shall not authorise the supplier to commence supply or where the supply has been discontinued for a period of one year and above, to recommence the supply at high or extra-high voltage to any consumer unless-

- (a) all conductors and apparatus situated on the premises of the consumer are so placed as to be inaccessible except to an authorised person and all operations in connection with the said conductors and apparatus are carried out by an authorised person;
- (b) the consumer has provided and agrees to maintain a separate building or a locked weather-proof and fire-proof enclosure of agreed design and location, to which the supplier at all times have access for the purpose of housing his apparatus and metering equipment, or where the provision for a separate building or enclosure is impracticable, the consumer has segregated the aforesaid apparatus of the supplier from any other part of his own apparatus:

1. Amended vide G.S.R.256, dated 26-3-1983

2. Subs. vide G.S.R.843, dated 7-9-1985

Provided that such segregation shall be by the provision of fire proof walls, if the Inspector considers it to be necessary:

Provided further that in the case of an out-door installation consumer shall suitably segregate the aforesaid apparatus belonging to the supplier from his own to the satisfaction of the Inspector;

(c) all pole type sub-stations are constructed and maintained in accordance with rule 69.

(2) The following provisions shall be observed where energy at high or extra-high voltage is supplied, converted, transformed or used:-

¹[(a) (i) clearances as per Indian Standard Code shall be provided for electrical apparatus so that sufficient space is available for easy operation and maintenance without any hazard to the operating and maintenance personnel working near the equipment and for ensuring adequate ventilation.

²[Provided that the owner of the transformer installation shall not allow any encroachment below such installations. The Electrical Inspector shall direct appropriate law enforcing authorities to remove such encroachments, if in his/her opinion, such encroachments pose a danger to the life of the operating personnel/public person or property.]

³[(ii) the following minimum safety working clearances shall be maintained for the bare conductors or live parts of any apparatus in out-door sub-stations, excluding overhead lines, of HV and EHV installations:-

High system Voltage (KV)	Safety working Clearance (Metres)
12	2.6
36	2.8
72.5	3.1
145	3.7
245	4.3
420	6.4
800	10.3

NOTES:

- (1) The above values are valid for altitude not exceeding 1000 Metres (m.). A correction factor of 1.25 per cent per 100m. is to be applied for increasing the clearance for altitudes more than 1000m. and up to 3000m.
- (2) The above safety working clearances are based on an insulation height of 2.44m. which is the height of lowest point on the insulator (where it meets the earthed metal) from the ground.
- (3) "Safety Working Clearance" is the minimum clearance to be maintained in air between the live part of the equipment on one hand and earth or another piece of equipment or conductor on which it is necessary to carry out the work, on the other.
- (4) The "Highest System Voltage" is defined as the highest rms phase to phase voltage which occurs under normal operating conditions at any time and at any point of the system. It excludes voltage transients (such as those due to system switching) and temporary voltage variations due to abnormal system conditions (such as those due to fault conditions or the sudden disconnection of large loads).]

1. Subs. vide. G.S.R. 358, dated 9-5-1987

2. Ins. vide G.S.R. 468 dated 25th November, 2000

3. Subs. vide G.S.R. 112, dated 1st April, 2000

- (b) The windings of motors or other apparatus within reach from any position in which a person may require to be, shall be suitably protected so as to prevent danger.
- (c) Where transformer or transformers are used, suitable provision shall be made, either by connecting with earth a point of the circuit at the lower voltage or otherwise, to guard against danger by reason of the said circuit becoming accidentally charged above its normal voltage by leakage from or contact with the circuit at the higher voltage.
- (d) A sub-station or a switch station with apparatus having more than 2000 litres of oil shall not ¹[***] be located in the basement where proper oil draining arrangement cannot be provided.
- (e) Where a sub-station or a switch station with apparatus having more than 2000 litres of oil is installed, whether indoor or out-doors, the following measures shall be taken namely:-
 - (i) The baffle walls ²[of 4 Hours fire rating] shall be provided between the apparatus in the following cases:-

1. The word 'ordinarily' omitted vide G.S.R. 358, 9-5-1987.

2. Ins. vide G.S.R. 358, dated 9-5-1987.

- A. single phase banks in the switch-yards of generating stations and sub-stations;
 - B. on the consumer premises;
 - C. where adequate clearance between the units is not available.
- (ii) Provisions shall be made for suitable oil soakpit and where use of more than 9000 litres of oil in any one oil tank, receptacle or chamber is involved, provision shall be made for the draining away or removal of any oil which may leak or escape from the tanks receptacles or chambers containing the same, special precautions shall be taken to prevent the spread of any fire resulting from the ignition of the oil from any cause and adequate provision shall be made for extinguishing any fire which may occur. Spare oil shall not be stored in any such sub-station or switch station.
- ¹[(iii) All the transformers and switchgears shall be maintained in accordance with the maintenance schedule given in the relevant code of practices of BIS and the authorised person shall keep a record thereof as required under rule 3(6).
- (iv) Notwithstanding anything contained in rule 64(2)(d) & 64(2)(f)(ii), only dry type of transformers shall be used for installations inside the residential/commercial buildings.]
- ²[(f) (i) Without prejudice to the above measures, adequate fire protection arrangement shall be provided for quenching the fire in the apparatus;
- (ii) Where it is necessary to locate the sub-station / switch station in the basement following measures shall be taken:-
- (a) The room shall necessarily be in the first basement at the periphery of the basement;
- (b) The entrances to the room shall be provided with fire resisting doors of 2 hour fire rating. A curb (sill) of a suitable height shall be provided at the entrance in order to prevent the flow of oil from a ruptured transformer into other parts of the basement. Direct access to the transformer room shall be provided from outside.
- ³[(c) The transformer shall be protected by an automatic high velocity water spray system or by carbondioxide or BCF (Bromochloro-difluoromethane) or BTM (Bromo-trifluoromethane) fixed installation system or Nitrogen injection and drain method.]
- (iii) Oil filled transformers installed indoors shall not be on any floor above the ground or below the first basement.]
- (g) Cable trenches inside the sub-stations and switch stations containing cables shall be filled with sand, pebbles or similar non-inflammable materials or completely covered with non-inflammable slabs;
- (h) Unless the conditions are such that all the conductors and apparatus may be made dead at the same time for the purpose of cleaning or for other work, the said conductors and apparatus shall be so arranged that these may be made dead in sections, and that work on any such section may be carried on by an authorised person without danger.
- (i) Only persons authorised under sub-rule (1) of rule 3, shall carry out the work on live lines and apparatus.]

1. Ins. vide G.S.R. 468, dated 25th November, 2000

2. Subs. vide G.S.R. 358, dated 9-5-1987

3. Ins. vide G.S.R. 468, dated 25th November, 2000

¹[(3) All EHV apparatus shall be protected against lightning as well as against switching over voltages. The equipment used for protection and switching shall be adequately co-ordinated with the protected apparatus to ensure safe operation as well as to maintain the stability of the inter-connected units of the power system.]

²**[64A. Additional provisions for use of energy at high and extra-high voltage.-**

The following additional provisions shall be observed where energy at high or extra-high voltage is supplied, converted, transferred or used, namely:-

- (1) Inter-locks – Suitable inter-locks shall be provided in the following cases:-
 - (a) Isolators and the controlling circuit breakers shall be inter-locked so that the isolators cannot be operated unless the corresponding breaker is in open position;
 - (b) Isolators and the corresponding earthing switches shall be inter-locked so that no earthing switch can be closed unless and until the corresponding isolator is in open position;
 - (c) Where two or more supplies are not intended to be operated in parallel, the respective circuit breakers or linked switches controlling the supplies shall be inter-locked to prevent possibility of any inadvertent paralleling or feedback;
 - (d) When two or more transformers are operated in parallel, the system shall be so arranged as to trip the secondary breaker of a transformer in case the primary breaker of that transformer trips;
 - (e) All gates or doors which give access to live parts of an installation shall be inter-locked in such a way that these cannot be opened unless the live parts are made dead. Proper discharging and earthing of these parts should be ensured before any person comes in close proximity of such parts;
 - (f) Where two or more generators operate in parallel and neutral switching is adopted, inter-lock shall be provided to ensure that generator breaker cannot be closed unless one of the neutrals is connected to the earthing system.
- (2) Protection – All systems and circuits shall be so protected as to automatically disconnect the supply under abnormal conditions.

The following protection shall be provided namely:-

- (a) Over current protection to disconnect the supply automatically if the rated current of the equipment, cable or supply line is exceeded for a time which the equipment, cable or supply line is not designed to withstand;
- (b) Earth-fault / earth leakage protection to disconnect the supply automatically if the earth fault current exceeds the limit of current for keeping the contact potential within the reasonable values;
- ³[(c) Gas pressure type and winding and oil temperature protection to give alarm and tripping shall be provided on all transformers of ratings 1000 KVA and above;]

1. Ins. vide G.S.R. 336, dated 23-4-1988

2. Ins. vide G.S.R. 358, dated 9-5-1987

3. Subs. vide G.S.R. 468, dated 25th November, 2000

- (d) Transformers of capacity 10 MVA and above shall be protected against incipient faults by differential protection; and
- (e) All generators with rating of 100 KVA and above shall be protected against earth fault / leakage. All generators of rating 1000 KVA and above shall be protected against faults within the generator winding using restricted earth fault protection or differential protection or by both.

¹[(f) High speed bus bar differential protection along with local breaker back up protection shall be commissioned and shall always be available at all 220 KV and above voltage sub-stations and switchyards and generating stations connected with the grid:

Provided that in respect of existing 220 KV sub-stations and switchyard having more than one incoming feeders, the high speed bus bar differential protection along with local breaker back up protection, shall be commissioned and shall always be available:

Provided further that the provisions contained in this sub-rule shall have effect in respect of the existing installations from the date to be specified by the appropriate Government but such a date shall not be later than a period of three (3) years from the date this rule comes into force.]

²**[65. Testing, Operation and Maintenance.** – (1) Before approval is accorded by the Inspector under rule 63, the manufacturer's test certificates shall, if required, be produced for all the routine tests as required under the relevant Indian Standard.

(2) No new HV or EHV apparatus, cable or supply line shall be commissioned unless such apparatus, cable or supply line are subjected to site tests as per relevant code of practice of the ³[Bureau of Indian Standards].

(3) No HV or EHV apparatus, cable or supply line which has been kept disconnected, for a period of 6 months or more, from the system for alterations or repair shall be connected to the system until such apparatus, cable or supply line are subjected to the relevant tests as per code of practice of ³[Bureau of Indian Standards].

(4) Notwithstanding the provisions of sub-rules (1) to (3) (both inclusive), the Inspector may require certain additional tests to be carried out before charging the installations or subsequently.

(5) All apparatus, cables and supply lines shall be maintained in healthy conditions and tests shall be carried out periodically as per the relevant codes of practice of the ³[Bureau of Indian Standards].

(6) Records of all tests, trippings, maintenance works and repairs of all equipment, cables and supply lines shall be duly kept in such a way that these records can be compared with earlier ones.

(7) It shall be the responsibility of the owner of all HV and EHV installations to maintain and operate the installations in a condition free from danger and as recommended by the manufacturer and / or by the relevant codes of practice of the ²[Bureau of Indian Standards] and / or by the Inspector.]

⁴[(8) Failures of transformers and reactors of 20 MVA and higher capacity shall be reported by the consumers and the suppliers of electricity within 48 hours of the occurrence of the failure, to the electrical inspector and Central Electricity Board. The reasons for failure and measures to be taken to avoid recurrence of failure shall be sent to the electrical inspector and Central Electricity Board within one month of the occurrence in the format given in Annexure XV.]

1. Subs. vide G.S.R. 468, dated 25th November, 2000

2. Subs. vide G.S.R. 358, dated 9-5-1987

3. Subs. vide G.S.R. 466, dated 17-8-1991

4. Subs. vide G.S.R. 468, dated 25th November, 2000

66. Metal sheathed electric supply lines. Precautions against excess leakage.-

- (1) The following provisions shall apply to electric supply lines (other than overhead lines ¹[***] for use at high or extra-high voltage:-
- (a) The conductors shall be enclosed in metal sheathing which shall be electrically continuous and connected with earth, and the conductivity of the metal sheathing shall be maintained and reasonable precautions taken where necessary to avoid corrosion of the sheathing:
- Provided that in the case of thermoplastic insulated and sheathed cables with metallic armour the metallic wire or tape armour shall be considered as metal sheathing for the purpose of this rule:

1. The words “of a supplier” omitted vide G.S.R. 358, dated 9-5-1987.

Provided further that this rule shall not apply to cable with thermoplastic insulation without any metallic screen or armour.

¹[(b) The resistance of the earth connection with metallic sheath shall be kept low enough to permit the controlling circuit breaker or cut-out to operate in the event of any failure of insulation between the metallic sheath and the conductor.]

(c) Where an electric supply-line as aforesaid has concentric cables and the external conductor is insulated from an outer metal sheathing and connected with earth, the external conductor may be regarded as the metal sheathing for the purposes of this rule provided that the foregoing provisions as to conductivity are complied with.

(2) Nothing in the provisions of sub-rule (1) shall preclude the employment in generating stations, sub-stations and switch-stations (including outdoor sub-stations and outdoor switch stations) of conductors for use at high or extra-high voltages which are not enclosed in metal sheathing or preclude the use of electric supply lines laid before the prescribed date to which the provisions of these rules apply.

67. Connection with earth.²[(1) All non-current carrying metal parts associated with HV/EHV installation shall be effectively earthed to a grounding system or mat which will:-

- (a) limit the touch and step potential to tolerable values;
- (b) limit the ground potential rise to tolerable values so as to prevent danger due to transfer of potential through ground, earth wires, cable sheath, fences, pipe lines, etc.;
- (c) maintain the resistance of the earth connection to such a value as to make operation of the protective device effective.

(1A) In the case of star-connected system with earthed neutrals or delta connected system with earthed artificial neutral point:-

- (a) The neutral point of every generator and transformer shall be earthed by connecting it to the earthing system as defined in Rule 61(4) and hereinabove by not less than two separate and distinct connections:

Provided that the neutral point of a generator may be connected to the earthing system through an impedance to limit the fault current to the earth:

Provided further that in the case of multi-machine system, neutral switching may be resorted to, for limiting the injurious effect of harmonic current circulation in the system;

- (b) In the event of an appreciable harmonic current flowing in the neutral connection so as to cause interference, with communication circuits, the generator or transformer neutral, shall be earthed through a suitable impedance;
- (c) In case of the delta connected system the neutral point shall be obtained by the insertion of a grounding transformer and current limiting resistance or Impedance

1. Subs. vide G.S.R. 1074, dated 16-11-1985.

2. Subs. vide G.S.R. 358, dated 9-5-1987.

wherever considered necessary at the commencement of such a system.]

- (2) Single-phase high or extra-high voltage systems shall be earthed in a manner approved by the Inspector.
- (3) In the case of a system comprising electric supply lines having concentric cables, the external conductor shall be the one to be connected with earth.
- (4) Where a supplier proposes to connect with earth an existing system for use at high or extra-high voltage which has not hitherto been so connected with earth he shall give not less than fourteen days' notice in writing together with particulars to the telegraph-authority of the proposed connection with earth.
- (5)(a) Where the earthing lead and earth connection are used only in connection with earthing guards erected under high or extra-high voltage overhead lines where they cross a telecommunication line or a railway line, and where such lines are equipped with earth leakage relays of a type and setting approved by the Inspector, the resistance shall not exceed 25 ohms.
- (b) Every earthing system belonging to either the supplier or the consumer shall be tested for its resistance to earth on a dry day during dry season not less than once a year. Records of such tests shall be maintained and shall be produced, if required before the Inspector or any officer appointed to assist him and authorised under sub-rule (2) of rule 4A.
- (6) In so far as the provisions of rule 61 are consistent with the provisions of this rule, all connections with earth shall also comply with the provisions of that rule.

68. General conditions as to transformation and control of energy.-(1) Where energy at high or extra-high voltage is transformed, converted, regulated or otherwise controlled in sub-stations or switch-stations (including outdoor sub-stations and out-door switch-stations) or in street boxes constructed underground, the following provisions shall have effect:-

- ¹[(a) Sub-stations and switch-stations shall preferably be erected above ground, but where necessarily constructed underground due provisions for ventilation and drainage shall be made and any space housing switchgear shall not be used for storage of any materials especially inflammable and combustible materials or refuse.]
- (b) Outdoor sub-stations except pole type sub-stations and outdoor switch-stations shall (unless the apparatus is completely enclosed in a metal covering connected with earth, the said apparatus also being connected with the system by armoured cables) be efficiently protected by fencing not less than 1.8 metres in height or other means so as to prevent access to the electric-supply lines and apparatus therein by an unauthorised person.
- (c) Underground street boxes (other than sub-stations) which contain transformers shall not contain switches or other apparatus, and switches, cut-outs or other apparatus required for controlling or other purposes shall be fixed in separate receptacles above ground wherever practicable.

1. Subs. vide G.S.R. 358, dated 9-5-1987.

(2) Where energy is transformed, suitable provisions shall be made either by connecting with earth a point of the system at the lower voltage or otherwise to guard against danger by reason of the said system becoming accidentally charged above its normal voltage by leakage from a contact with the system at the higher voltage.

69. Pole type sub-stations. – Where platform type construction is used for a pole type sub-station and sufficient space for a person to stand on the platform is provided a substantial hand rail shall be built around the said platform and if the hand rail is of metal, it shall be connected with earth:

Provided that in the case of pole type sub-station on wooden supports and wooden platform the metal hand-rail shall not be connected with earth.

70. Condensers. – Suitable provision shall be made for immediate and automatic discharge of every static condenser on disconnection of supply.

71. Additional provisions for supply to high voltage luminous tube sign installation. – (1) Any person who proposes to use or who is using energy for the purpose of operating a luminous tube sign installation, or who proposes to transform or who is transforming energy to a high voltage for any such purpose shall comply with the following conditions:-

- (a) All live parts of the installation (including all apparatus and live conductors in the secondary circuit, but excluding the tubes except in the neighbourhood of their terminals) shall be inaccessible to unauthorised persons and such parts shall be effectively screened.
- (b) Irrespective of the method of obtaining the voltage of the circuit which feeds the luminous discharge tube sign, no part of any conductor of such circuit shall be in metallic connection (except in respect of its connection with earth) with any conductor of the supply system or with the primary winding of the transformer.
- (c) All live parts of an exterior installation shall be so disposed as to protect them against the effects of the weather and such installation shall be so arranged and separated from the surroundings as to limit, as far as possible, the spreading of fire.
- (d) The secondary circuit shall be permanently earthed at the transformer and the core of every transformer shall be earthed.
- (e) Where the conductors of the primary circuit are not in metallic connection with the supply conductors, (e.g., where a motor-generator or a double-wound convertor is used), one phase of such primary circuit shall be permanently earthed at the motor generator or convertor, or at the transformer.
- ¹[(ee) An earth leakage circuit breaker of sufficient rating shall be provided on the low voltage side to detect the leakage in such luminous tube sign installations.]
- (f) A final sub-circuit which forms the primary circuit of a fixed luminous discharge tube sign installation shall be reserved solely for such purpose.

1. Ins. vide G.S.R. 844, dated 7-9-1985.

- (g) A separate primary final sub-circuit shall be provided for each transformer or each group of transformers having an aggregate input not exceeding 1,000 volt- amperes, of a fixed luminous-discharge-tube sign installation.
- (h) An interior installation shall be provided with suitable adjacent means for disconnecting all phases of the supply except the “neutral” in a three-phase four wire circuit.
- (i) For installations on the exterior of a building a suitable emergency fire-proof linked switch to operate on all phases except the neutral in a three phase four wire circuit shall be provided and fixed in a conspicuous position at not more than 2.75 metres above the ground.
- (j) A special “caution” notice shall be affixed in a conspicuous place on the door of every high voltage enclosure to the effect that the low voltage supply must be cut off before the enclosure is opened.
- (k) Where static condensers are used, they shall be installed on the load side of the fuses and the primary (low voltage) side of the transformers.
- (l) Where static condensers are used on primary side, means shall be provided for a

Provided that static condensers or any circuit interrupting devices on the high or extra-high voltage side shall not be used without the approval in writing of the Inspector.

(2) The owner or user of any luminous tube sign or similar high voltage installation shall not bring the same into use without giving to the Inspector not less than 14 days notice in writing of his intention so to do.

72. Additional provisions for supply to high voltage electrode boilers. – (1) Where a system having a point connected with earth is used for supply of energy at high or extra-high voltage to an electrode boiler which is also connected with earth, the following conditions shall apply:-

- (a) The metal work of the electrode boiler shall be efficiently connected to the metal sheathing and metallic armouring (if any) of the high voltage electric supply line whereby energy is supplied to the electrode boiler.
- (b) The supply of energy at high or extra-high voltage to the electrode boiler shall be controlled by a suitable circuit-breaker so set as to operate in the event of the phase currents becoming unbalanced to the extent of 10 per cent of the rated current consumption of the electrode boiler under normal conditions of operation:

Provided that if in any case a higher setting is essential to ensure stability of operation of the electrode boiler, the setting may be increased so as not to exceed 15 per cent of the rated current consumption of the electrode boiler under normal conditions of operation.

- (c) An inverse time element device may be used in conjunction with the aforesaid circuit breaker to prevent the operation thereof unnecessarily on the occurrence of unbalanced phase currents of momentary or short duration.
- (d) The supplier shall serve a notice in writing on the telegraph-authority at least seven days prior to the date on which such supply of energy is to be afforded specifying the location of every point (including the earth connection of the electrode boiler) at which the system is connected with earth.

(2) The owner or user of any high or extra-high voltage electrode boiler shall not bring the same into use without giving the Inspector not less than 14 days' notice in writing of his intention so to do.

73. Supply to X-ray and high frequency installation.-(1) Any person who proposes to employ or who is employing energy for the purpose of operating an X-ray or similar high-frequency installation, shall comply with the following conditions:-

- (a) Mechanical barriers shall be provided to prevent too close an approach to any high-voltage parts of the X-ray apparatus, except the X-ray tube and its leads, unless such high-voltage parts have been rendered shock-proof by being shielded by earthed metal or adequate insulating material.
- (b) Where extra-high voltage generators operating at 300 peak KV or more are used, such generators shall be installed in rooms separate from those containing the other equipment and any step-up transformer employed shall be so installed and protected as to prevent danger.
- (c) A suitable switch shall be provided to control the circuit supplying a generator, and shall be so arranged as to be open except while the door of the room housing the generator is locked from the outside.
- (d) X-ray tubes used in therapy shall be mounted in an earthed metal enclosure.
- (e) Every X-ray machine shall be provided with a milliammeter or other suitable measuring instrument, readily visible from the control position and connected, if practicable, in the earthed lead, but guarded if connected in the high-voltage lead.
- ¹[(ee)Notwithstanding the provisions of clause (e), earth leakage circuit breaker of sufficient rating shall be provided on the low voltage side to detect the leakage in such X-ray installations.]
- (f) This sub-rule shall not apply to shock-proof portable units or shock-proof self contained and stationary units.

Note: The expression "shock proof", as applied to X-Ray and high-frequency equipment, shall mean that such equipment is guarded with earthed metal so that no person may come into contact with any live part.

(2)(a) In the case of non-shock-proof equipment, overhead high-voltage conductors, unless suitably guarded against personal contact, shall be adequately spaced and high-voltage leads on tilting tables and fluoroscopes shall be adequately insulated or so surrounded by barriers as to prevent inadvertent contact.

(b) The low voltage circuit of the step up transformer shall contain a manually operated control device having overload protection, in addition to the over-current device for circuit protection, and these devices shall have no exposed live parts and for diagnostic work there shall be an additional switch in the said circuit, which shall be of one of the following types:-

- (i) a switch with a spring or other mechanism that will open automatically except while held close by the operator, or

1. Ins. vide G.S.R. 844, dated 7-9-1985.

- (ii) a time switch which will open automatically after a definite period of time for which it has been set.
- (c) If more than one piece of apparatus be operated from the same high or extra-high voltage source each shall be provided with a high or extra-high voltage switch to give independent control.
- (d) Low frequency current-carrying parts of a machine of the quenched-gap or open gap type shall be so insulated or guarded that they cannot be touched during operation, the high frequency circuit proper which delivers high-frequency current normally for the therapeutic purposes, being exempted.
- (e) All X-ray generators having capacitors shall have suitable means for discharging the capacitors manually.
- (f) Except in the case of self-contained units, all 200 peak KV or higher, X-ray generators shall have a sphere gap installed in the high-voltage system adjusted so that it will break down on over-voltage surges.

(3)(a) All non-current carrying metal parts of tube stands, fluroscopes and other apparatus shall be properly earthed and insulating floors, mats or platforms shall be provided for operator in proximity to high or extra-high voltage parts unless such parts have been rendered shock proof.

(b) Where short wave therapy machines are used, the treatment tables and examining chairs shall be wholly non-metallic.

(4) The owner of any X-ray installation or similar high frequency apparatus shall not bring the same into use without giving to the Inspector not less than 14 days' notice in writing of his intention to do so:

Provided that the aforesaid notice shall not be necessary in the case of shock-proof portable X-ray and high-frequency equipment which have been inspected before the commencement of their use and periodically, thereafter.

CHAPTER VIII

¹[OVERHEAD LINES, UNDER GROUND CABLES AND GENERATING STATIONS]

74. Material and strength. – (1) All conductors of overhead lines other than those specified in sub-rule (1) of rule 86 shall have a breaking strength of not less than 350 kg.

(2) Where the voltage is low and the span is of less than 15 metres and is on the owner's or consumer's premises, a conductor having an actual breaking strength of not less than 150 kg may be used.

75. Joints. Joints between conductors of overhead lines shall be mechanically and electrically secure under the conditions of operation. The ultimate strength of the joint shall not be less than 95 per cent of that of the conductor, and the electrical conductivity not less than that of the conductor:

1. Subs. vide G.S.R. 466, dated 17-8-1991.

¹[Provided that no conductor of an overhead line shall have more than two joints in a span.]

76. Maximum stresses: Factors of safety.-(1)(a) The owner of every overhead line shall ensure that it has the following minimum factors of safety:-

- | | | |
|---|---|-----|
| (i) for metal supports | - | 1.5 |
| (ii) for mechanically processed concrete supports | - | 2.0 |
| (iii) for hand-moulded concrete supports | - | 2.5 |
| (iv) for wood supports | - | 3.0 |

The minimum factors of safety shall be based on such load as would cause failure of the support to perform its function (assuming that the foundation and other components of the structure are intact).

The aforesaid load shall be -

- (i) equivalent to the yield point stress or the modulus of rupture, as the case may be, for supports subject to bending and vertical loads.
- (ii) the crippling load for supports used struts.

The said owner shall also ensure that the strength of the supports in the direction of the line is not less than one-fourth of the strength required in the direction transverse to the line:

Provided that in the case of latticed steel or other compound structures, factors of safety shall not be less than 1.5 under such broken wire conditions as may be specified by the State Government in this behalf.

(b) The minimum factor of safety for stay-wires, guard-wires or bearer-wires shall be 2.5 based on the ultimate tensile strength of the wire.

(c) The minimum factor of safety for conductors shall be 2, based on their ultimate tensile strength. In addition, the conductors tension at 32⁰ C, without external load, shall not exceed the following percentages of the ultimate tensile strength of the conductor:-

Initial unloaded tension	35 per cent
Final unloaded tension	25 per cent

Provided that in the case of conductors having a cross section of a generally triangular shape, such as conductors composed of 3-wires, the final unloaded tension at 32⁰ C shall not exceed 30 per cent of the ultimate tensile strength of such conductor.

(2) For the purpose of calculating the factors of safety prescribed in sub-rule (1)-

- (a) the maximum wind pressure shall be such as the State Government may specify in each case;
- (b) for cylindrical bodies the effective area shall be taken as two-thirds of the projected area exposed to wind pressure;
- (c) for latticed steel or other compound structures the wind pressure on the lee side members shall be taken as one-half of the wind pressure on the windward side members and the factors of safety shall be calculated on the crippling load of struts and upon the elastic limit of tension members;

(d) the maximum and minimum temperatures shall be such as the State Government may specify in each case.

(8) Notwithstanding anything contained in sub-rules (1) and (2), in localities where overhead lines are liable to accumulations of ice or snow the State Government may, by order in writing, specify the loading conditions for the purpose of calculating the factor of safety.

77. Clearance above ground of the lowest conductor.-(1) No conductor of an overhead line, including service lines, erected across a street shall at any part thereof be at a height of less than-

- | | |
|--------------------------------------|------------|
| (a) for low and medium voltage lines | 5.8 metres |
| (b) for high voltage lines | 6.1 metres |

(2) No conductor of an overhead line, including service lines, erected along any street shall at any part thereof be at a height less than-

- | | |
|--------------------------------------|------------|
| (a) for low and medium voltage lines | 5.5 metres |
| (b) for high voltage lines | 5.8 metres |

(3) No conductor of an overhead line including service lines, erected elsewhere than along or across any street shall be at a height less than -

- | | |
|--|------------|
| (a) for low, medium and high voltages lines upto and including 11,000 volts, if bare | 4.6 metres |
| (b) for low, medium and high voltage lines upto and including 11,000 volts, if insulated | 4.0 metres |
| (c) for high voltage lines above 11,000 volts | 5.2 metres |

(9) For extra-high voltage lines the clearance above ground shall not be less than 5.2 metres plus 0.3 metre for every 33,000 volts or part thereof by which the voltage of the line exceeds 33,000 volts;

Provided that the minimum clearance along or across any street shall not be less than 6.1 metres.

78. Clearance between conductors and trolley wires.¹[(1) No conductor of an overhead line crossing a tramway or trolley bus route using trolley wires shall have less than the following clearances above any trolley wire-

- | | |
|----------------------------------|------------|
| (a) low and medium voltage lines | 1.2 metres |
|----------------------------------|------------|

Provided that where an insulated conductor suspended from a bearer wire crosses over a trolley wire the minimum clearance for such insulated conductor shall be 0.6 metre.

- | | |
|---|------------|
| (b) high voltage lines up to and including 11,000 volts | 1.8 metres |
| (c) high voltage lines above 11,000 volts | 2.5 metres |
| (d) extra-high voltage lines | 3.0 metres |

²[(2) In any case of a crossing referred to in sub-rule(1), whoever lays his line later in time, shall provide the clearance between his own line and the line which will be crossed in accordance with the provisions of said sub-rule;

1. Rule 78 re-numbered as sub-rule(1) thereof vide G.S.R. No. 528, dated 19-7-1986

2. Ins. vide G.S.R. No. 528, dated 19-7-1986

Provided that if the later entrant is the owner of the lower line and is not able to provide adequate clearance, he should bear the cost for modification of the upper line so as to comply with this rule.]

79. Clearance from buildings of low and medium voltage lines and service lines-

(1) Where a low or medium voltage, overhead line passes above or adjacent to or terminates on any building, the following minimum clearances from any accessible point, on the basis of maximum sag, shall be observed:-

- (a) for any flat roof, open balcony, varandah roof and lean-to-roof-
 - (i) when the line passes above the building a vertical clearance of 2.5 metres from the highest point, and
 - (ii) when the line passes adjacent to the building a horizontal clearance of 1.2 metres from the nearest point, and
- (b) for pitched roof-
 - (i) when the line passes above the building a vertical clearance of 2.5 metres immediately under the lines, and
 - (ii) When the line passes adjacent to the building a horizontal clearance of 1.2 metres.

(2) Any conductor so situated as to have a clearance less than that specified in sub-rule(1) shall be adequately insulated and shall be attached at suitable intervals to a bare earthed bearer wire having a breaking strength of not less than 350 kg.

(3) The horizontal clearance shall be measured when the line is at a maximum deflection from the vertical due to wind pressure.

¹ [EXPLANATION-For the purpose of this rule, expression “building” shall be deemed to include any structure, whether permanent or temporary.]

80. Clearances from buildings of high and extra-high voltage lines- (1) Where a high or extra-high voltage overhead line passes above or adjacent to any building or part of a building it shall have on the basis of maximum sag a vertical clearance above the highest part of the building immediately under such line, of not less than-

- (a) for high voltage lines upto and including 33,000 volts 3.7 metres
- (b) for extra-high voltage lines 3.7 metres plus 0.30 metre for every additional 33,000 volts or part thereof.

(2) The horizontal clearance between the nearest conductor and any part of such building shall, on the basis of maximum deflection due to wind pressure, be not less than-

- (a) for high voltage lines upto and including 11,000 volts 1.2 metres
- (b) for high voltage lines above 11,000 volts and up to and including 33,000 volts 2.0 metres
- (c) for extra-high voltage lines 2.0 metres plus 0.3 metre for every additional 33,000 volts for part thereof.

¹[Explanation-For the purpose of this rule express "building" shall be deemed to include any structure, whether permanent or temporary.]

81. Conductors at different voltages on same supports- Where conductors forming parts of systems at different voltages are erected on the same supports, the owner shall make adequate provision to guard against danger to linesman and others from the lower voltage system being charged above its normal working voltage by leakage from or contact with the higher voltage system and the methods of construction and the clearances between the conductors of the two systems shall be subject to prior approval of the Inspector.

82. Erection of or alteration to buildings, structures, flood banks and elevation of roads- (1) If at any time subsequent to the erection of an overhead line (whether covered with insulating material or bare), any person proposes to erect a new building or structure or flood bank or to raise any road level or to carry out any other type of work whether permanent or temporary or to make in or upon any building, or structure or flood bank or road, any permanent or temporary addition or alteration, he and the contractor when he employs to carry out the erection, addition or alteration, shall if such work, building, structure, flood bank, road or additions and alterations, thereto, would, during or after the construction result in contravention of any of the provisions of rule 77, 79 or 80, give notice in writing of his intention to the supplier and to the Inspector and shall furnish therewith a scale drawing showing the proposed building, structure, flood bank, road, any addition or alteration and scaffolding required during the construction.

(2)(a) On receipt of the notice referred to in sub-rule (1) or otherwise, the supplier shall examine whether the line under reference was lawfully laid and whether the person was liable to pay the cost of alteration and if so, send a notice without undue delay, to such person together with an estimate of the cost of the expenditure likely to be incurred to so alter the overhead line and require him to deposit, within 30 days of the receipt of the notice with the supplier, the amount of the estimated cost.

(b) If the person referred to in sub-rule (1) disputes the suppliers estimated cost of alteration of the overhead line or even the responsibility to pay such cost the dispute may be referred to the Inspector by either of the parties whereupon the same shall be decided by the Inspector.

(3) No work upon such building, structure, flood bank, road and addition or alteration thereto shall be commenced or continued until the Inspector has certified that the provisions of rule 77, 79 or 80 are not likely to be contravened either during or after the aforesaid construction:

Provided that the Inspector may, if he is satisfied that the overhead line has been so guarded as to secure the protection of persons or property from injury, or risk of injury, permit the work to be executed prior to the alteration of the overhead line or in the case of temporary addition or alteration, without alteration of the overhead line.

(4) On receipt of the deposit, the supplier shall alter the overhead line within one month of the date of deposit or within such longer period as the Inspector may allow and ensure that it shall not contravene the provisions of rule 77, 79 or 80 either during or after such construction.

1. Added vide G.S.R. No. 844, dated 7-9-1985.

(5) In the absence of an agreement to the contrary between the parties concerned, the cost of such alteration of the overhead line laid down shall be estimated on the following basis, namely:-

- (a) the cost of additional material used on the alteration giving due credit for the depreciated cost of the material which would be available from the existing line;
- (b) the wages of Labour employed in affecting the alteration;
- (c) supervision charges to the extent of 15 per cent of the wages mentioned in clause (b); and
- (d) any charges incurred by the supplier in complying with the provisions of section 16 of the Act in respect of such alterations.

(6) Where the estimated cost of the alteration of the overhead line is not deposited the supplier shall be considered as an aggrieved party for the purpose of this rule.

¹**[82A. Transporting and Storing of material near overhead lines.-**(1) No rods, pipes or similar materials shall be taken below or in the vicinity of any bare overhead conductors or lines if they are likely to infringe the provisions for clearances under rules 79 and 80, unless such materials are transported under the direct supervision of a competent person authorised in this behalf by the owner of such overhead conductors or lines.

(2) Under no circumstances rods, pipes or other similar materials shall be brought within the flash over distance of bare live conductors or lines; and

(3) No material or earth work or agricultural produce shall be dumped or stored or trees grown below or in the vicinity of bare overhead conductors / lines so as to reduce the requisite safety clearances specified under rules 79 and 80.]

83. Clearances: General.-For the purpose of computing the vertical clearance of an overhead line, the maximum sag of any conductor shall be calculated on the basis of the maximum sag in still air and the maximum temperature as specified by the State Government under rule 76(2)(d). Similarly, for the purpose of computing any horizontal clearance of an overhead line the maximum deflection of any conductor shall be calculated on the basis of the wind pressure specified by the State Government under rule 76(2)(a) or may be taken as 35⁰, whichever is greater.

84. Routes: Proximity to aerodromes.-Overhead lines shall not be erected in the vicinity of aerodromes until the aerodrome authorities have approved in writing the route of the proposed lines.

85. Maximum interval between supports.-All conductors shall be attached to supports at intervals not exceeding the safe limits based on the ultimate tensile strength of the conductor and the factor of safety prescribed in rule 76:

Provided that in the case of overhead lines carrying low or medium voltage conductors, when erected in, over, along or across any street, the interval shall not, without the consent in writing of the Inspector, exceed 65 metres.

86. Conditions to apply where telecommunication lines and power lines are carried on same supports.-(1) Every overhead telecommunication line erected on supports carrying a power line shall consist of conductors each having a breaking strength of not less than 270 kg.

1. Ins. vide G.S.R. 358, dated 9-5-1987.

(2) Every telephone used on a telecommunication line erected on supports carrying a power line shall be suitably guarded against lightning and shall be protected by cut-outs.

(3) Where a telecommunication line is erected on supports carrying a high or extra-high voltage power line, arrangement shall be made to safeguard any person using the telephone against injury resulting from contact, leakage or induction between such power and telecommunication lines.

87. Lines crossing or approaching each other:- (1) Where an overhead line crosses or is in proximity to any telecommunication line, either the owner of the overhead line or the telecommunication line, whoever lays his line later, shall arrange to provide for protective devices or guarding arrangements, in a manner laid down in the Code of Practice or the guidelines prepared by the Power and Telecommunication Coordination Committee and subject to the provisions of the following sub-rules:-

(2) When it is intended to erect a telecommunication line or an overhead line which will cross or be in proximity to an overhead line or a telecommunication line, as the case may be, the person proposing to erect such line shall give one month's notice of his intention so to do along with the relevant details of protection and drawings to the owner of the existing line.

¹[(3) Where an overhead line crosses or is in proximity to another overhead line, guarding arrangements shall be provided so to guard against the possibility of their coming into contact with each other.

Where an overhead line crosses another overhead line, clearances shall be as under:-

²[Minimum clearances in metres between lines crossing each other,

Sl. No.	Nominal System Voltage	11-66 KV	110-132 KV	220 KV	400 KV	800 KV
1.	Low & Medium	2.44	3.05	4.58	5.49	7.94
2.	11-66KV	2.44	3.05	4.58	5.49	7.94
3.	110-132KV	3.05	3.05	4.58	5.49	7.94
4.	220KV	4.58	4.58	4.58	5.49	7.94
5.	400 KV	5.49	5.49	5.49	5.49	7.94
6.	800 KV	7.94	7.94	7.94	7.94	7.94]

Provided that no guardings are required when an extra high voltage line crosses over another extra-high voltage, high voltage, medium or low voltage line or a road or a tram subject to the condition that adequate clearances are provided between the lowest conductor of the extra-high voltage line and the top most conductor of the overhead line crossing underneath the extra-high voltage line and the clearances as stipulated in rule 77 from the topmost surface of the road is maintained]

(4) A person erecting or proposing to erect a line which may cross or be in proximity with an existing line, may normally provide guarding arrangements on his own line or require

1. Subs.vide G.S.R.256 dated 26-3-1983

2. Subs.vide G.S.R.466 dated 17-8-1991

the owner of the other overhead line to provide guarding arrangements as referred to in sub-rule(3).

(5) In all cases referred to in the preceding sub-rules the expenses of providing the guarding arrangements or protective devices shall be borne by the person whose line was last erected.

(6) Where two lines cross, the crossing shall be made as nearly at right angles as the nature of the case admits and as near the support of the lines as practicable, and the support of the lower line shall not be erected below the upper line.

(7) The guarding arrangements shall ordinarily be carried out by the owner of the supports on which it is made and he shall be responsible for its efficient maintenance.

(8) All work required to be done by or under this rule shall be carried out to the satisfaction of the Inspector.

88. Guarding:- (1) Where guarding is required under these rules the provisions of sub-rules(2) to (4) shall apply.

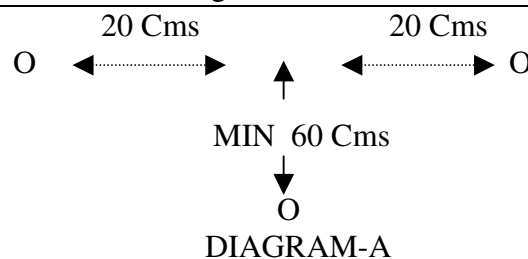
(2) Every guard-wire shall be connected with earth at each point at which its electrical continuity is broken.

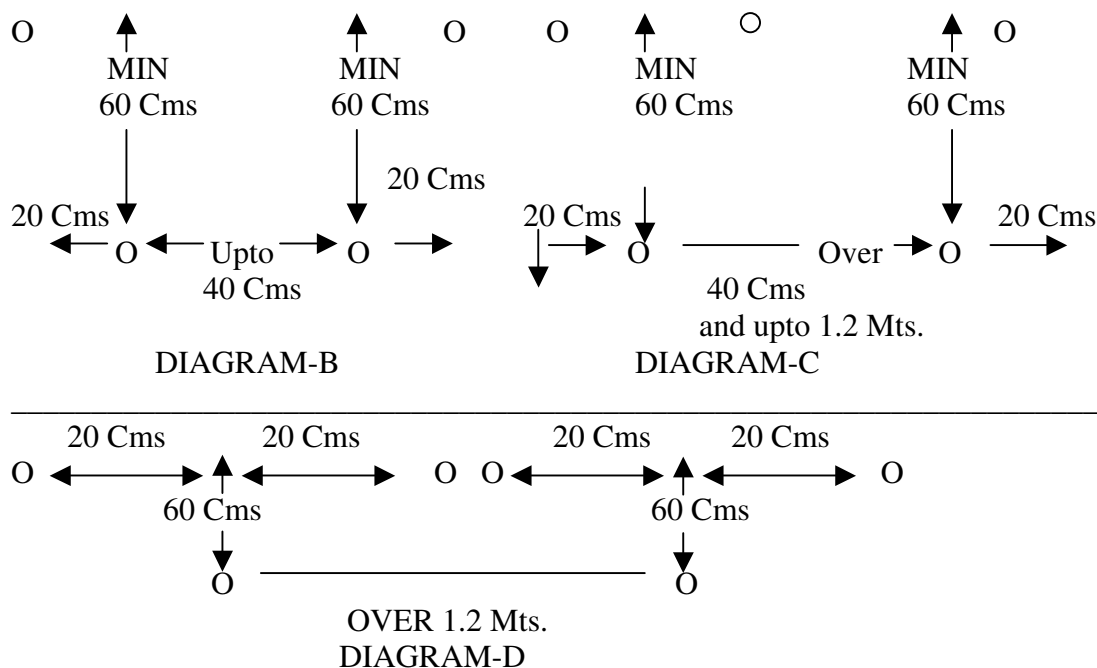
(3) Every guard-wire shall have an actual breaking strength of not less than 635 kg and if made of iron or steel, shall be galvanised.

(4) Every guard-wire or cross-connected systems of guard-wires shall have sufficient current-carrying capacity to ensure the rendering dead, without risk of fusing of the guard-wire or wires till the contact of any live wire has been removed.

(10) Lines-crossing trolley-wires-In the case of a crossing over a trolley-wire the guarding shall fulfil the following conditions, namely:-

- (a) where there is only one trolley-wire, two guard-wires shall be erected as in diagram A;
- (b) where there are two trolley –wires and the distance between them does not exceed 40 cms, two guard-wires shall be erected as in diagram B;
- (c) where there are two trolley wires and the distance between them exceeds 40 cms but does not exceed 1.2 metres, three guard-wires shall be erected as in diagram C;
- (d) where there are two trolley-wires and the distance between them exceeds 1.2 metres, each trolley-wire shall be separately guarded as in diagram D;
- (e) the rise of trolley boom shall be so limited that the trolley leaves the trolley-wire, it shall not foul the guard-wires; and
- (f) where a telegraph-line is liable to fall or be blown down upon an arm, stay-wire or span-wire and so slide-down upon a trolley-wire, guard hooks shall be provided to prevent such sliding.





89. Service-lines from Overhead lines- No Service-line or tapping shall be taken off an overhead line except at a point of support:

¹[Provided that the number of tappings per conductor shall not be more than four in case of low and medium voltage connections.]

90. Earthing- (1) All metal supports and all reinforced and prestressed cement concrete supports of overhead lines and metallic fittings attached thereto, shall be permanently and efficiently earthed. For this purpose, a continuous earth wire shall be provided and securely fastened to each pole and connected with earth ordinarily at three points in every km, the spacing between the points being as nearly equidistance as possible. Alternatively, each support and the metallic fitting attached thereto shall be efficiently earthed.

²[(1A) Metallic bearer wire used for supporting insulated wire of low and medium voltage overhead service lines shall be efficiently earthed or insulated.]

(2) Each stay-wire shall be similarly earthed unless insulator has been placed in it at a height not less than 3.0 metres from the ground.

91. Safety and protective devices-(1) Every overhead line, (not being suspended from a dead bearer wire and not being covered with insulating material and not being a trolley-wire) erected over any part of street or other public place or in any factory or mine or on any consumer's premises shall be protected with a device approved by the Inspector for rendering the line electrically harmless in case it breaks.

(2) An Inspector may by notice in writing require the owner of any such overhead line wherever it may be erected to protect it in the manner specified in sub-rule(1)

³(3) [The owner of every high and extra-high voltage overhead line shall make adequate arrangements to the satisfaction of the Inspector to prevent unauthorised persons from

1. Added vide G.S.R.45, dated 23-1-1993

2. Subs.vide G.S.R. No. 732 dated 3-8-1985

3. Substituted vide G.S.R. No. 838 dated 9-8-1980

ascending any of the supports of such overhead lines which can be easily climbed upon without the help of a ladder to special appliances, Rails, reinforced cement concrete poles and pre-stressed cement concrete poles without steps, tubular poles, wooden supports without steps, I-sections and channels shall be deemed as supports which cannot be easily climbed upon for the purpose of this rule.]

92. Protection against lightning- (1) The owner of every overhead line ¹[sub-station or generating station] which is so exposed as to be liable to injury from lightning shall adopted efficient means for diverting to earth any electrical surges due to lightning.

²[(2) The earthing lead for any lightning arrestor shall not pass through any iron or steel pipe, but shall be taken as directly as possible from the lightning-arrestor to a separate earth electrode and/or junction of the earth mat already provided for the high and extra-high voltage sub-station subject to the avoidance of bends wherever practicable.

Note-A vertical ground electrode shall be connected to this junction of the earth mat.]

93. Unused overhead lines- (1) Where an overhead line ceases to be used as an electric supply line, the owner shall maintain it in a safe mechanical condition in accordance with rule 76 or shall remove it.

(2) Where any overhead line ceases to be used as an electric supply line, an Inspector, may by a notice in writing served on the owner, require him to maintain it in a safe mechanical condition or to remove it within fifteen days of the receipt of the notice.

CHAPTER IX ELECTRIC TRACTION

94. Additional rules for electric traction. – (1) The rules in this Chapter apply only where energy is used for purposes of traction:

Provided that nothing in this Chapter shall apply to energy used for the public carriage of passengers, animals or goods on, or for the lighting or ventilation of the rolling stock of any railway or tramway subject to the provisions of the Indian Railways Act, 1890 (9 of 1890).

(2) In this Chapter the conductor used for transmitting energy to a vehicle is referred to as the “line” and the other conductor as the “return”.

(3) The owner of the line, return, rails or trolley wire, as the case may be, shall be responsible for the due observance of rules 95 to 108.

95. Voltage of supply to vehicle. – No person shall supply energy at high or extra-high voltage to any trolley-wire or other conductor used in direct electrical and mechanical connection with any vehicle, except with the written approval of the Central or the State Government, as the case may be, and subject to such conditions as the State Government may think reasonable and proper in the circumstances.

96. Insulation of lines. – Every line shall be insulated throughout.

Insulation of returns. – (1) Where any rails on which cars run, or any conductors laid between or within 0.9 metre of such rails, form any part of a return, such part may be uninsulated. All other returns or parts of a return, shall be insulated,

1. Subs. vide G.S.R. No. 466 dated 17-8-91

2. Subs. vide G.S.R. No. 1050 dated 9-11-1985

unless they are of such conductivity as to secure the conditions required by sub-rules (2) and (3) of rule 98.

(2) Where any part of a return is uninsulated, it shall be connected with the negative or neutral of the system.

98. Proximity to metallic pipes, etc. – (1) Where an uninsulated return is in proximity to any metallic pipe, structure or substance not belonging to the owner of the return, he shall, if so required by the owner of such pipe, structure or substance, connect his return therewith at the latter's expense.

(2) Where the return is partly or entirely uninsulated, the owner shall, in the construction and maintenance of his system, adopt such means for reducing the difference produced by the current between the potential of the uninsulated return at any one point and the potential of the uninsulated return at any other point as to ensure that the difference of potential between the uninsulated return and any metallic pipe, structure or substance in the vicinity shall not exceed four volts where the return is relatively positive, or one and one-third volts where the return is relatively negative.

(3) The owner of any such pipe, structure or substance as is referred to in sub-rule (2) may, in respect of it require the owner of the uninsulated return at reasonable times and intervals to ascertain by test in his presence or in that of his representative, whether the condition specified in sub-rule (2) is fulfilled, and, if such condition is found to be fulfilled, all reasonable expenses of, and incidental to, the carrying out of the test shall be borne by the owner of the pipe, structure or substance.

99. Difference of potential on return. – Where the return is partly or entirely uninsulated, the owner shall keep a continuous record of the difference of potential, during the working of his system, between every junction of an insulated return with an uninsulated return and the point on the route most distant from that junction, and the difference of potential shall not, under normal running conditions, exceed a mean value of seven volts between the highest momentary peak and the average for the hour of maximum load.

100. Leakage on conduit system. – Where both the line and the return are placed within a conduit, the following conditions shall be fulfilled in the construction and maintenance of the system:-

- (a) where the rails are used to form any part of the return, they shall be electrically connected (at distances not exceeding 30 metres apart), with the conduit by means of copper strips having a cross-sectional area of at least 0.40 sq. cm. Or by other means of equal conductivity. Where the return is wholly insulated and contained within the conduit, the latter shall be connected with earth at the generating station or sub-station through an instrument suitable for the indication of any contact or partial contact of either the line or the return with the conduit; and
- (b) the leakage-current shall be ascertained daily, before or after the hours of running, when the line is fully charged; and if at any time it is found to exceed 0.6 ampere per km. of single tramway track, the transmission and use of energy shall be suspended unless the leakage is stopped within twenty-four hours.

101. Leakage on system other than conduit system. – Where both the line and the return are not placed within a conduit, the leakage current shall be ascertained daily

before or after the hours of running, when the line is fully charged; and if at any time it is found to exceed 0.3 ampere per km. of single tramway track, the transmission and use of energy shall be suspended unless the leakage is stopped within twenty-four hours.

102. Passengers not to have access to electric circuit. – Precautions to the satisfaction of an Inspector shall be taken by the owner of every vehicle to prevent : -

- (a) the access of passengers to any portion of the electric circuit where there is danger from electric shock;
- (b) any metal, hand – rail or other metallic substance liable to be handled by passengers, becoming charged.

103. Current density in rails. – Where rails on which cars run are used as a return, the current density in such rails shall not under ordinary working conditions, exceed 1.4 amperes per sq. cm. Of cross-sectional area.

104. Isolation of sections. – Every trolley-wire shall be constructed in sections not exceeding 1.6 km. in length, and means shall be provided for isolating each section.

105. Minimum size and strength of trolley- wire. – No trolley-wire shall be of less cross-sectional area than 0.5 sq. cm. Or shall have an actual breaking load of less than 2000 kg.

106. Height of trolley-wire and length of span. – A trolley-wire or a traction-feeder on the same supports as a trolley-wire shall nowhere be at a height from the surface of the street of less than 5.2 metres except, where it passes under a bridge or other fixed structure, or through or along a tunnel or mineshaft or the like in which case it shall be suspended to the satisfaction of an Inspector.

107. Earthing of guard wires. – Every guard wire shall be connected with earth at each point at which its electrical continuity is broken and shall also be connected with the rails at intervals of not more than five spans.

107A. Proximity to magnetic observatories and laboratories. – Traction works shall not be carried out in the vicinity of geomagnetic observatories and laboratories without the concurrence of the Central Government or of any officer authorised by it in this behalf.

108. Records. – (1) The owner shall, so far as is consistent with his system of working, keep the following records, namely : -

- (a) daily records showing –
 - (i) the maximum working current from the source of supply;
 - (ii) the maximum working voltage at the source of supply;
 - (iii) the difference of potential, as required by rule 99, and
 - (iv) the leakage current (if any), as required by rule 100 and rule 101, and;
 - (b) occasional records showing:–
 - (i) every test made under sub-rules (2) and (3) of rule 98;
 - (ii) every stoppage of leakage, together with the time occupied; and
 - (iii) particulars of any abnormal occurrence affecting the electrical working of the system.
- (2) Such records shall be open to examination by an Inspector or by any person authorised in writing by an Inspector.

CHAPTER X

ADDITIONAL PRECAUTIONS TO BE ADOPTED IN MINES AND OIL-FIELDS

109. Application of Chapter. – (1) The rules in this Chapter shall apply only where energy is used in mines as defined in the Mines Act, 1952 (35 of 1952).

¹[(2) In mines and oil fields, the rules in this Chapter shall not apply to apparatus above the ground level except where such apparatus may directly affect the safety of the persons employed in underground, open-cast and oil fields.]

110. Responsibility for observance. – (1) It shall be the duty of the owner, agent, engineer or manager of a mine, or of the agent, engineer of any company operating in an oil field, or of the owner, engineer of one or more drilled wells situated in an oil field, to comply with and enforce the following rules and it shall be duty of all persons employed to conduct their work in accordance with such rules.

(2) Adequate number of authorised supervisors and electricians shall be on duty in every mine or oil-field while energy is being used therein.

²[Explanation. – For the purposes of this rule, the word “engineer” shall –

(a) in the case of a coal mine, have the same meaning as assigned to it in the Coal Mines Regulations, 1957;

(b) in the case of a metalliferous mine, have the same meaning as assigned to it in the Metalliferous Mines Regulations, 1961; and

(c) in the case of an oil mine, mean the ‘Installation Manager’ under the Oil Mines Regulations, 1984.]

111. Notices. – (1) On or before the first day of February in every year, in respect of every mine or oil-field, returns giving the size and type of apparatus, together with such particulars in regard to circumstances of its use which may be required by the Inspector, shall be sent to the Inspector by the persons specified in rule 110 in the form set out in Annexure-X or XI, whichever is applicable.

(2) The persons specified in rule 110 shall also give to Inspector not less than seven days’ notice in writing of the intention to bring into use any new installation in a mine or oil-field giving details of apparatus installed and its location :

Provided that in case of any additions or alterations to an existing low and medium voltage installation, immediate notice in writing shall be sent to the Inspector before such additions or alterations are brought into use.

(3) This rule shall not apply to telecommunication or signalling apparatus.

112. Plans. – (1) A correct plan, on the same scale as the plan kept at the mine in fulfilment of the requirements of the Mines Act, 1952 (35 of 1952), shall be available in the office at the mine showing the position of all fixed apparatus and conductors therein, other than lights, telecommunication or signalling apparatus, or cables for the same.

(2) A similar plan on the scale not less than 25 cm. to a km. (1:4000) shall be kept by the manager or owner of one or more wells in any oil-field.

(3) A similar plan on such scale as the Central Government may direct, showing the position of all electric supply lines, shall be kept in the office of any licensee or other person transmitting or distributing energy in a mine or oil-field.

1. Subs. vide G.S.R. 112, dated 1st April, 2000

2. Subs. vide G.S.R. 45, dated 23.1.1993.

- (4) The plans specified under the provisions of this rule shall be examined and corrected as often as necessary to keep them reasonably up-to-date. The dates of such examinations shall be entered thereon by the manager or owner of the mine or wells and such plans shall be available to the Inspector, or an Inspector of Mines at any time.

113. Lighting, communications and fire precautions. – (1) In a mine illuminated by electricity, one or more flame safety lamps, or other lights approved by the Inspector of mines, shall be maintained in a state of continuous illumination in all places where, failure of the electric light at any time would be prejudicial to safety.

- (2) Efficient means of communication shall be provided in every mine between the point where the switchgear provided under sub-rule (1) of rule 121 is erected and the shaft bottom or other distributing centres in the mines.

- (3) Fire extinguishing appliances of adequate capacity and of an approved type shall be installed and properly maintained in every place in a mine containing apparatus, other than cables, telecommunications and signalling apparatus.

114. Isolation and fixing of transformer, switchgear, etc. – (1) Where necessary to prevent danger of mechanical damage, transformers and switchgear shall be placed in a separate room, compartment or box.

- (2) Unless, the apparatus, is so constructed, protected and worked as to obviate the risk of fire, no inflammable material shall be used in the construction of any room, compartment or box containing apparatus, or in the construction of any of the fittings therein. Each such room, compartment or box shall be substantially constructed and shall be kept dry and ¹[illuminated] and efficient ventilation shall be provided for all apparatus installed therein.

- (3) Adequate working space and means of access, clear of obstruction and free from danger, shall, so far as circumstances permit, be provided for all apparatus that has to be worked or attended to and all handles intended to be operated shall be conveniently placed for that purpose.

115. Method of earthing. – Where earthing is necessary in a mine it shall be carried out by connection to an earthing system at the surface of the mine, in a manner approved by the Inspector.

116. Protective equipment. – ²[(1) In the interest of safety, appropriate equipment shall be suitably placed in the mines for automatically disconnecting supply to any part of the system, where a fault, including an earth fault occurs. Fault current shall not be more than 750 milli-amps in 550/1100 volt systems for underground oil fields and 50 amps in 3.3 KV/6.6 KV systems in open cast mines. The magnitude of the earth fault current shall be limited to these specified values by employing suitably designed, restricted neutral system of power supply.]

- (2) The operation of the switchgear and the relays shall be recorded daily at the generating station, sub-station or switch station in register kept for the purpose.

- (3) The effectiveness of the switchgear and the protective system ³[shall always be kept and maintained in working order, shall be checked once every three months] and the result thereof shall be recorded in a separate register kept for the purpose.

Earthing metal, etc. – (1) All metallic sheaths, coverings, handles, joint boxes, switchgear frames, instrument covers, switch and fuse covers of boxes, all lampholders (unless efficiently protected by an insulated covering made of fire resisting material) and the frames and bedplates of generators, transformers and motors (including portable motors), shall be earthed by connection to an earthing system in the manner prescribed in rule 115.

1. Subs. vide G.S.R. 45, dated 23.1.1993.

2. Subs. vide G.S.R. 112, dated 1st April, 2000

3. Subs. vide G.S.R. 45, dated 23.1.1993.

- (2) Where cables are provided with a metallic covering constructed and installed in accordance with clause (d) of rule 122, such metallic covering may be used as a means of connection to the earthing system.
- (3) All conductors of an earthing system shall have conductivity, at all parts and all joints, at least equal to 50 per cent of that of the largest conductor used solely to supply the apparatus, a part of which it is desired to earth:

Provided that no conductor of an earthing system shall have a cross-sectional area less than 0.15 sq. cm. except in the case of the earth conductor of a flexible cable used with portable apparatus where the voltage does not exceed 125 volts, and the cross-sectional area and conductance of the earthcore is not less than that of the largest of the live conductors in the cable.

- (4) All joints in earth conductors and all joints in the metallic covering of cables shall be properly soldered or otherwise efficiently made.
- (5) No switch, fuse or circuit-breaker shall be inserted in any earth conductor.
- (6) This rule shall not apply (except in the case of portable apparatus) to any system in a mine in which the voltage does not exceed 30 volts.

1[118. **Voltage limits.** – Energy shall not be transmitted into a mine at a voltage exceeding 11000 volts and shall not be used therein at a voltage exceeding 6600 volts:

Provided that:

- (a) Where hand-held portable apparatus is used, the voltage shall not exceed 125 volts;
- (b) Where electric lighting is used:-
 - (i) in underground mines, the lighting system shall have a mid or neutral point connected with earth and the voltage shall not exceed 125 volts between phases;
 - (ii) on the surface of a mine or in an open cast mine, the voltage may be raised to 250 volts, if the neutral or the mid point of the system is connected with earth and the voltage between the phases does not exceed 250 volts;
- (c) Where portable hand-lamps are used in underground working of mine, the voltage shall not exceed 30 volts;
- (d) Where any circuit is used for the remote control or electric inter-locking of apparatus, the circuit voltage shall not exceed 30 volts:

Provided that in fixed plants, the said voltage may be permitted upto 650 volts, if the bolted type plug is used.]

²[119. **Transformers.** – Where energy is transformed, suitable provision shall be made to guard against danger by reason of the lower voltage apparatus becoming accidentally charged above its normal voltage by leakage from or contact with the higher voltage apparatus.]

120. **Switchgear and terminals.** – Switchgear and all terminals, cable-ends, cable-joints and connections to apparatus shall be totally enclosed and shall be constructed, installed and maintained as to comply with the following requirements:-

1. Subs. vide G.S.R. 361, dated 7.5.1983.

2. Subs. vide G.S.R. 45, dated .23.1.1993.

- (a) all parts shall be of mechanical strength sufficient to resist rough usage;
- (b) all conductors and contact areas shall be of adequate current-carrying capacity and all joints in conductors shall be properly soldered or otherwise efficiently made;
- (c) the lodgement of any matter likely to diminish the insulation or affect the working of any switchgear shall be prevented;
- (d) all live parts shall be so protected or enclosed as to prevent persons accidentally coming into contact with them and to prevent danger from arcs, short-circuits, fire, water, gas or oil;
- (e) where there may be risk of igniting gas, coal-dust, oil or other inflammable material, all parts shall be so protected as to prevent open sparking; and
- (f) every switch or circuit-breaker shall be so constructed as to be capable of opening the circuit, if controls and dealing with any short-circuit without danger.

121. **Disconnection of supply.** – (1) Properly constructed switchgear for disconnecting the supply of energy to a mine or oil-field shall be provided ¹[***] at a point approved by the Inspector. During the time any cable supplying energy to the mine from the aforesaid switchgear is live, a person authorised to operate the said switchgears shall be available within easy reach thereof:

²[Provided that in the case of gassy coal seam of degree II and degree III, the main mechanical ventilator operated by electricity shall be interlocked with the switchgear so as to automatically disconnect the power supply in the event of stoppage of main mechanical ventilator.]

- (2) When necessary in the interest of safety, appropriate apparatus suitably placed, shall be provided for disconnecting the supply from every part of a system.
- (3) Where considered necessary by the Inspector in the interest of safety, the apparatus specified in sub-rule (2) shall be so arranged as to disconnect automatically from the supply any section of the system subjected to a fault.
- (4) Every motor shall be controlled by switchgear which shall be so arranged as to disconnect the supply from the motor and from all apparatus connected thereto. Such switchgear shall be so placed as to be easily operated by the person authorised to operate the motor.

³[(5) Whenever required by the Inspector the motor shall be controlled by a switchgear to disconnect automatically the supply in the event of conditions of over-current, over-voltage and single phasing.]

122. **Cables.** – All cables, other than flexible cables for portable or transportable apparatus, shall comply with the following requirements:-

- (a) All such cables (other than the outer conductor of a concentric cable) shall be covered with insulating material and shall be efficiently protected from mechanical damage and supported at sufficiently frequent intervals and in such a manner as to prevent damage to such cables;

1. Omitted vide G.S.R. 45, dated 23.1.1993.

2. Ins. vide G.S.R. 45, dated 23.1.1993.

3. Ins. vide G.S.R.137, dated 12.2.1983.

- (b) (i) except as provided in clause (c), no cables other than concentric cables or two-core or multicore cables protected by a metallic covering or single core cables protected by a metallic covering and which contain all the conductors of a circuit shall be used-
 - (1) where the voltage exceeds 125 volts, or
 - (2) when an Inspector considers that there is risk of igniting gas or coal-dust or other inflammable material, and so directs;
 - (ii) the sheath of metal-sheathed cables and the metallic armouring of armoured cables shall be of a thickness not less than that recommended from time to time in the appropriate standard of the ¹[Bureau of Indian Standards];
 - (c) Where a medium voltage direct current system is used, two single core cables may be used for any circuit provided that their metallic coverings are bounded together by earth conductors so placed that the distance between any two consecutive bonds is not greater than 30 metres measured along either cable;
 - (d) The metallic covering of every cable shall be-
 - (i) electrically and mechanically continuous throughout;
 - (ii) earthed, if it is required by sub-rule (1) of rule 117 to be earthed by a connection to the earthing system of conductivity not less than of the same length of the said metallic covering;
 - (iii) efficiently protected against corrosion where necessary;
 - (iv) of a conductivity at all parts and at all joints at least equal to 50 per cent of the conductivity of the largest conductor enclosed by the said metallic covering; and
 - (v) where there may be risk of igniting gas, coal-dust, or other inflammable material, so constructed as to prevent, as far as practicable, the occurrence of open sparking so as the result of any fault or leakage from live conductors;
 - (e) Cables and conductors where connected to motors, transformers, switchgear and other apparatus, shall be installed so that :-
 - (i) they are mechanically protected by securely attaching the metallic covering to the apparatus; and
 - (ii) the insulating material at each cable end is efficiently sealed so as to prevent the diminution of its insulating properties;
 - (f) Where necessary to prevent abrasion or to secure gas-tightness, properly constructed glands or bushes shall be provided;
 - (g) Unarmoured cables or conductors shall be conveyed either in metallic pipes or metal casings or suspended from efficient insulators by means of non-conducting materials which will not cut the covering and which will prevent contact with any timbering or metal work. If separate insulated conductors are used, they shall be installed at least 3.75 cm. apart and shall not be brought together except at lamps, switches and fittings.
123. **Flexible cables.** – (1) Flexible cables for portable or transportable apparatus shall be two-core or multi-core (unless required for electric welding), and shall be

1. Subs. vide G.S.R. 466, dated 17.8.1991.

covered with insulating material which shall be efficiently protected from mechanical injury. If flexible metallic covering is used either as the outer conductor of a concentric cable or as a means of protection from mechanical injury, it shall not be used by itself to form an earth conductor for such apparatus, but it may be used for that purpose in conjunction with an earthing core.

(2) Every flexible cable intended for use with portable or transportable apparatus shall be connected to the system and to such apparatus by properly constructed connectors: Provided that for high voltage machines a bolted type connector shall be used and the trailing cable shall be suitably anchored at the machine end.

(3) At every point where flexible cables are joined to main cables, a ¹[circuit breaker] shall be provided which is capable of ¹[automatically] disconnecting the supply from such flexible cables.

(4) Every flexible cable attached to a portable or transportable machine shall be examined periodically by the person authorised to operate the machine, and if such cable is used underground, it shall be examined at least once in each shift by such person. If such cable is found to be damaged or defective, it shall forthwith be replaced by a cable in good condition.

(5) If the voltage of the circuit exceeds low voltage, all flexible cable attached to any transportable apparatus shall be provided with flexible metallic screening or pliable armouring.

²[Provided that this sub-rule shall not apply to flexible cables attached to any transportable apparatus used in open cast mines where reeling and unreeling of such cables is necessary as per design features of the equipment.]

(6) All flexible metallic screening or armouring specified in sub-rule (5) shall comply with the provisions of rule 122 (d):

Provided that in the case of separately screened flexible cables the conductance of each such screen shall not be less than 25 per cent of that the power conductor and the combined conductance of all such screens shall in no case be less than that of 0.15 sq. cm. Copper conductor.

(7) Flexible cable exceeding 90 metres in length shall not be used with any portable or transportable apparatus:

Provided that such flexible cable when used with coalcutting machines for long wall operation shall not exceed 180 metres in length:

Provided further that the aforesaid cable in case of an open cast mine, when used with ³[electrically operated heavy earth moving machinery] shall not exceed 300 metres in length.

(8) Flexible cable, when installed in a mine, shall be efficiently supported and protected from mechanical injury.

(9) Flexible cables shall not be used with apparatus other than portable or transportable apparatus.

1. Subs. vide G.S.R. 466, dated 17.8.1991.

2. Ins. vide G.S.R.137, dated 12th February, 1983

3. Ins. vide G.S.R. 45, dated 23.1.1993.

(10) Where flexible cables are used they shall detached or otherwise isolated from the source of supply when not in use, and arrangements shall be made to prevent the energising of such cables by unauthorised persons.

124. Portable and transportable machines. – The person authorised to operate an electrically driven coal-cutter, or other portable or transportable machine, shall not leave the machine while it is in operation and shall, before leaving the area in which such machine is operating, ensure that the supply is disconnected from the flexible cable which supplies the machine. When any such machine is in operation, steps shall be taken to ensure that the flexible cable is not dragged along by the machine:

¹[Provided that all portable and transportable machines used in underground mines shall operate on remote control from the concerned switchgear with Pilot Core Protection.]

125. Sundry precautions.- (1) All apparatus shall be maintained reasonably free from dust, dirt and moisture, and shall be kept clear of obstruction.

(2) All apparatus other than portable and transportable apparatus shall be housed in a room, compartment or box so constructed as to protect the contents from damage occasioned by falling material or passing traffic.

(3) Inflammable or explosive material shall not be stored in any room, compartment or box containing apparatus, or in the vicinity of any apparatus.

(4) Should there be a fault in any circuit, the part affected shall be made dead without delay and shall remain so until the fault has been remedied.

(5) While lamps are being changed the supply shall be disconnected.

(6) No lampholder shall be in metallic connection with the guard or other metal work of a portable hand lamp.

(7) The following notices in Hindi and local language of the district, so designed and protected as to be easily legible at all times, shall be exhibited:-

(a) at all places where electrical apparatus is in use, a notice forbidding unauthorised person to operate or otherwise interfere with such apparatus;

(b) at those places in the interior or at the surface of the mine where a telephone or other means of communication is provided, a notice giving full instructions to persons authorised to effect the disconnection, at the surface of the mine, of the supply of energy to the mine.

(8) All apparatus, including portable and transportable apparatus, shall be operated only by those persons who are authorised for the purpose.

(9) Where a plug-and-socket-coupling other than of bolted type is used with flexible cables, an electrical inter-lock or other approved device shall be provided to prevent the opening of the coupling while the conductors are live.

²[126. **Precautions where gas exists.** – (1) In any part of a coal-seam of the first degree gassiness –

(a) all cables shall be constructed, installed, protected, operated and maintained in such a manner as to prevent risk of open sparking;

(b) at any place which lies in-by of the last ventilation connection, all signalling,

1. Added vide G.S.R. 45, dated 23.1.1993.

2. Subs. vide G.S.R.253, dated 7.3.1981.

telecommunication ¹[and remote control] circuits shall be so constructed, installed, protected, operated and maintained as to be intrinsically safe;

(c) all apparatus including portable and transportable apparatus including lighting fittings used at any place which lies in by of the last ventilation connection shall be flame-proof.

(2) At any place which lies in any part of a coal-seam of second and third degree gassiness –

(a) all signalling, telecommunication ¹[and remote control] circuits shall be so constructed, installed, protected, operated and maintained as to be intrinsically safe;

(b) all cables shall be constructed, installed, protected, operated and maintained in such a manner as to prevent risk of open sparking;

(c) all apparatus, including portable and transportable apparatus used at any place within 90 metres of any working face or goaf in case of a second degree gassymine and within 270 metres of any working face or goaf in case of third degree gassymine or at any place which lies in-by of the last ventilation connection or in any return airways shall be flame-proof;

(d) all electric lamps shall be enclosed in flame-proof enclosures.

(3) In any oil mine or oil-field, at any place within the Danger Areas, -

(a) all signalling, telecommunication ¹[and remote control] circuits shall be so constructed, installed, operated, protected and maintained as to be intrinsically safe;

(b) all cables shall be so constructed, installed, operated and maintained as to prevent risk of open sparking;

(c) all apparatus including portable and transportable apparatus shall be flame-proof;

(d) all electric lamps shall be enclosed in flame-proof enclosures.

(4) In any coal-seam of degree second and degree third gassiness or the danger zone of oil-mine the supply shall be discontinued, -

(a) immediately, if open sparking occurs;

(b) during the period required for examination or adjustment of the apparatus, which would necessitate the exposing of any part liable to open sparking;

(c) the supply shall not be reconnected until the apparatus has been examined by the electrical supervisor or one of his duly appointed assistants until the defect, if any, has been remedied or the necessary adjustment made;

(d) a flame safety lamp shall be provided and maintained in a state of continuous illumination near an apparatus (including portable or transportable apparatus) which remains energised and where the appearance of the flame of such safety lamps indicates the presence of inflammable gas, the supply to all apparatus in the vicinity shall be immediately disconnected and the incident reported forthwith to an official of the mine; ²[and such apparatus shall be interlocked with the controlling switch

1. Subs. vide G.S.R. 466, dated 17.8.1991.

2. Added vide G.S.R. 45, dated 23.1.1993.

in such a manner as to disconnect power supply automatically in the event of percentage of inflammable gas exceeding one and one quarter in that particular district:]

Provided that where ¹[apparatus] for automatic detection of the percentage of inflammable gas or vapour are employed in addition to the flame safety lamps, such ¹[apparatus] shall be approved by the Inspector of Mines and maintained in perfect order.

- (5) (i) In any part of a coal-seam of any degree of gassiness or in ²[any hazardous] area of an oil-mine, if the presence of inflammable gas in the general body of air is found any time to exceed one and one quarter ³[per cent], the supply of energy shall be immediately disconnected from all cables and apparatus in the area and the supply shall not be reconnected so long as the percentage of inflammable gas remains in excess of one and one quarter ²[per cent].

⁴[In an oil mine where concentration of inflammable gas exceed 20% of its lowest explosive limit, the supply of electric energy shall be cut-off immediately from all cables and apparatus lying within 30 metres of the installation and all sources of ignition shall also be removed from the said area and normal work shall not be resumed unless the area is made gas-free:]

⁵[Provided that such disconnection shall not apply to intrinsically safe environmental monitoring scientific instruments.]

- (ii) Any such disconnection or reconnection of the supply shall be noted in the logsheet which shall be maintained in the form set out in Annexure – XII and shall be reported to the Inspector.
- (6) The provisions of this rule shall apply to any metalliferous mine which may be notified by the Inspector of Mines if inflammable gas occurs or if the Inspector of Mines is of the opinion that inflammable gas is likely to occur in such mine.

Explanation – For the purpose of this rule, -

- (1) the expression ‘coal-seam of first degree gassiness’, ‘coal-seam of second degree gassiness’, ‘coal-seam of third degree gassiness’ and ‘flame-proof apparatus’ shall have the meanings respectively assigned to them in the Coal Mines Regulations, 1957.
- (2) The following areas in an oil-mine or oil-field shall be known as ²[hazardous areas], namely:-
 - (a) an area of not less than 90 metres around an oil-well where a blow-out has occurred or is likely to occur, as may be designated by the engineer-in-charge or the seniormost official present at the site;
 - (b) an area within 90 metres of an oil-well which is being tested by open flow;
 - (c) an area within 15 metres of –
 - (i) a producing well-head or any point of open discharge of the crude therefrom or other point where emission of ²[hazardous] atmosphere is normally likely to arise, or
 - (ii) any wildcat or exploration well-head being drilled in an area where abnormal pressure conditions are known to exist, or

1. Subs. vide G.S.R. 45, dated 23-1-1993.

2. Subs. vide G.S.R. 466, dated 17-8-1991.

3. Ins. vide G.S.R. 466, dated 17-8-1991

4. Ins. vide G.S.R. 45 dated 23-1-1993

5. Ins. vide G.S.R. 466 dated 17-8-1991

- (iii) any exploration or interspaced well-head being drilled in the area where abnormal pressure conditions are known to exist; or
- (d) any area within 4.5 metres of –
 - (i) any producing well-head where a closed system of production is employed such as to prevent the emission or accumulation in the area in normal circumstances of a ¹[hazardous] atmosphere; or
 - (ii) exploration or interspaced well-head being drilled in an area where the pressure conditions are normal and where the system of drilling employed includes adequate measures for the prevention in normal circumstances of emission or accumulation within the area of a ¹[hazardous] atmosphere; or
 - (iii) an oil-well which is being tested other than by open flow.

Explanation – For the purposes of clause (d) ¹[hazardous] atmosphere means an atmosphere containing any inflammable gases or vapours in a concentration capable of ignition.

²[(e) All appliances, equipments and machinery that are or may be used in zone 0, zone-1 & Zone-2 hazardous areas shall be of such type, standard and make as approved by the Inspector by a general or special order in writing.

Explanation. – (i) “Zone 0 hazardous area” means “an area in which hazardous atmosphere is continuously present.”

- (ii) “Zone 1 hazardous area” means “an area in which hazardous atmosphere is likely to occur under normal operating conditions”.
- (iii) “Zone 2 hazardous area” means “an area in which hazardous atmosphere is likely to occur under abnormal operating conditions”.]

127. **Shot-firing.** – (1) When shot-firing is in progress adequate precautions shall be taken to protect apparatus and conductors other than those used for shot-firing from injury.

(2) Current from lighting or power circuits shall not be used for firing shots.

(3) The provisions of rule 123 shall apply in regard to the covering and protection of shot-firing cables, and adequate precautions shall be taken to prevent such cable touching other cables and apparatus.

128. **Signalling.** – Where electrical signalling is used –

- (a) adequate precautions shall be taken to prevent signal and telephone wires coming into contact with other cables and apparatus;
- (b) the voltage used in any one circuit shall not exceed 30 volts; and
- (c) contact-makers shall be so constructed as to prevent the accidental closing of the circuit.

³[(d) bare conductors, where used shall be installed in suitable insulators.]

129. **Haulage.** – Haulage by electric locomotives on the overhead trolley-wire system, at medium or low voltage, and haulage by storage battery locomotives may be used

1. Subs. vide G.S.R. 466, dated 17.8.1991.

2. Ins. vide G.S.R. 466, dated 17.8.1991.

3. Ins. vide G.S.R. 45, dated 23.1.1993.

with the prior consent in writing of the Inspector, and subject to such conditions as he may impose in the interests of safety.

130. Earthing of neutral points. – Where the voltage of an alternating current system exceeds 30 volts, the neutral or mid-point shall be earthed by connection to an earthing system in the manner prescribed in rule 115.

Provided that when the system concerned is required for blasting and signalling purposes, the provisions of this rule shall not apply:

¹[Provided further that in case of unearthed neutral system adequate protection shall be provided with the approval of the Inspector.]

²[131. **Supervision.** – (1) (i) One or more electrical supervisors as directed by the Inspector shall be appointed in writing by the owner, agent or manager of a mine or by the agent or the owner, of one or more wells in an oil field to supervise the installation.

(ii) The electrical supervisor so appointed shall be the person holding a valid Electrical Supervisor's Certificate of Competency, covering mining installation issued under sub-rule (1) of rule 45.

(iii) If the Inspector considers necessary for the compliance with the duties specified in this rule, he may direct the owner or agent of the mine to appoint one or more electricians, who shall be persons holding licence under sub-rule (1) of rule 45.

(2) Every person appointed to operate, supervise, examine or adjust any apparatus shall be competent to undertake the work which he is required to carry-out as directed by the engineer.

(3) The electrical supervisor shall be responsible for the proper performance of the following duties, by himself or by electrician appointed under sub-rule (1):-

(a) through examination of all apparatus (including the testing of earth conductors and metallic coverings for continuity) as often as may be necessary to prevent danger;

(b) examination and testing of all new apparatus, and of all apparatus, re-erected in the mine before it is put into service in a new position.

(4) In the absence of any electrical supervisor for more than three days, the owner, agent or manager of the mine or the agent or owner of one or more oil-wells in an oil-field, shall appoint in writing a substitute electrical supervisor.

(5) (i) The electrical supervisor or the substitute electrical supervisor appointed under sub-rule (4) to replace him shall be personally responsible for the maintenance at the mine or oil-field, of a log-book made up of the daily log sheets prepared in the form set out in Annexure – XII.

(ii) The results of all tests carried out in accordance with the provisions of sub-rule (3) shall be recorded in the log-sheets prepared in the form set out in Annexure -- XII.]

132. Exemptions. – The provisions of rules 110 to 128 both inclusive and rule 131 shall not apply in any case, where, on grounds of emergency or special circumstances, exemption is obtained from the Inspector. In granting any such exemption the Inspector may prescribe such conditions as he thinks fit.

1. Ins. vide G.S.R. 45, dated 23.1.1993.

2. Subs. vide G.S.R. 253, dated 7.3.1983.

CHAPTER XI

MISCELLANEOUS

133. **Relaxation by Government.** – (1) The State Government, or where mine, oil-fields or railways or works executed for or on behalf of the Central Government, are affected, the Central Government, may by order in writing, direct that any of the provisions of rules in Chapter IV other than rules 44A and 46, and all rules in Chapters V, VI, VII, VIII and IX shall be relaxed generally or in particular case to such extent and subject to such conditions as it may think fit.
- (2) The Central Government may, by order in writing, direct that any of the provisions of Chapter X of these rules shall be relaxed in any particular case to such an extent and subject to such conditions as it may think fit.
134. **Relaxation by Inspector.** – The Inspector, may, by order in writing, direct that any of the provisions of rules 44, ¹[50(1)(a), (b) and (d), 50A(2)], 51(1), 61(2), 63, 64(2), 65, 71 to 73 (inclusive), 76 to 80 (inclusive), 90, ²[118], 119(1)(a), 123(5), 123(7), ²[123(9) and 130], shall be relaxed in any case to such extent and subject to such conditions as he may think fit.
- (2) Where the voltage of any system does not exceed 125 volts the Inspector may, by order in writing, direct that any of the provisions of rules 29 to 34 (inclusive), 36 to 39 (inclusive), 83, 92, 94 to 107 (inclusive) shall, in addition to the rules specified in sub-rule (1), be relaxed as regards such systems to such extent and subject to such conditions as he may think fit.
- (3) Every relaxation so directed shall be reported forthwith to, and shall be subject to disallowance or revision by, the State Government, or where the relaxation affects mines, oil-fields or railways, by the Central Government.
135. **Supply and use of energy by non-licensees and others.** – Where any person other than a non-licensee is supplied with energy by a non-licensee or other person or has his premises for the time being connected to the conductors or plant of a non-licensee or other person, or himself generates energy and uses such energy or part thereof, such person shall be deemed to be a consumer for the purposes of rules 9, 10, 29 to 33 (inclusive), 45 to 70 (inclusive), 87 and 142 and non-licensee or other person shall be subject to all the liabilities imposed on a licensee by these rules.
136. **Responsibility of Agents and Managers.** – Where any person is responsible for the observance of any of these rules, every agent and manager of such person shall also be responsible for such observance in respect of matters under their respective controls.
137. **Mode of entry.** – All persons entering in pursuance of the Act or these rules, any building which is used as a human dwelling or a place of worship shall, in making such entry have due regard so far as may be compatible with the exigencies of the purpose for which such entry is made, to the social and religious usages of the occupant of the building entered.
138. **Penalty for breaking seal.** – Where, in contravention of rule 56 any seal referred to in that rule is broken –

1. Subs. vide G.S.R. 45, dated 23.1.1993.

2. Subs. vide G.S.R. 466, dated 17.8.1991.

- (a) the person breaking the seal shall be punishable with fine which may extend to two hundred rupees; and
- (b) the consumer when he has not himself broken the seal shall be punishable with fine which may extend to fifty rupees unless he proves that he used all reasonable means in his power to ensure that the seal should not be broken.

138A. Penalty for breach of rule 44A. – Where, in contravention of rule 44A, any person responsible for the generation, transformation, transmission, conversion, distribution, supply or use of energy fails to report to the Inspector and other authorities concerned the occurrence of accidents, such person shall be punishable with fine which may extend to three hundred rupees.

139. Penalty for breach of rule 45. – Where any electrical installation work of the nature specified in sub-rule (1) of rule 45 has been carried out otherwise than –

- (a) under the direct supervision of a person holding a certificate of competency issued by the State Government under that rule; and
- (b) in the absence of any applicable exemption under the proviso to sub-rule of that rule, by an electrical contractor licensed by the State Government in this behalf,

the consumer owner or occupier, the contractor (if any) or the person through whom the work is being or was carried out and the person under whose immediate supervision the work is being or was carried out, shall each be punishable with fine which may extend to three hundred rupees.

¹[140. **Penalty for breach of rule 82.** – (a) Where no notice is given under rule 82(1) or the amount of estimate as demanded under rule 82(2) is not deposited, both the persons proposing and the contractor engaged for erecting a new building or structure whether permanent or temporary or for making in or upon any building or structure any permanent or temporary additions or alterations, shall be deemed to have committed a breach of rule 82(1) and shall be punishable with a fine which may extend to three hundred rupees.

- (b) If any person commences or continues any work in contravention of rule 82(3), in or upon any such building, structure, flood bank, road or carries out addition or alteration thereto, the person contravening the same shall be punishable with a fine which may extend to three hundred rupees.

In addition to this, the supplier shall, after obtaining the concurrence of the Inspector discontinue the supply, if any, to such building, structure, flood bank, or road etc. but only after giving forty-eight hours notice to the person concerned in writing of disconnection of supply and shall not commence the supply until he and the inspector are satisfied that the cause has been removed.]

140A. Penalty for breach of rule 77, 79 or 80. – Where a person is responsible for any construction which is or which results in contravention of the provisions of rule 77, 79 or 80, he and the contractor whom he employs shall be punishable with a fine which may extend to three hundred rupees, and in the case of continuing breach, with a further daily fine which may extend to fifty rupees.

141. Penalty for breach of rules. – Any person other than an Inspector or any officer appointed to assist the Inspector who being responsible for the observance of any of

1. Subs. vide G.S.R. 529, dated 19.7.1986

these rules commits a breach thereof, shall be punishable for every such breach with fine which may extend to three hundred rupees, and in the case of continuing breach with a further fine which may extend to fifty rupees, for every day after first during which the breach has continued.

142.Application of rules. – Subject to the provisions of sub-section (2) of section 58, these rules shall be binding on all persons, companies and undertakings to whom licences have been granted or with whom agreements have been made by or with the sanction of Government for supply or use of electricity before the commencement of the Act.

143.Repeal. – The Indian Electricity Rules, 1937, are hereby repealed:
Provided that any order made, notification issued or anything done or any action taken under any of the said rules shall be deemed to have been made, issued, done or taken under the corresponding provisions of the rules.

ANNEXURE I

[See clause (c) of sub-rule (1) of rule 2]

SPECIFICATION RELATING TO THE DEPOSITION OF SILVER

The electrolyte shall consist of a solution from 15 to 20 parts by weight of silver nitrate in 100 parts of distilled water. The solution must only be used once and only for so long that not more than 30 per cent of the silver in the solution is deposited.

The anode shall be of silver, and the cathode of platinum. The current density at the anode shall not exceed 1/5 ampere per square centimetre and at the cathode 1/50 ampere per square centimetre.

Not less than 100 cubic centimetres of electrolyte shall be used in a voltameter.

Care must be taken that no particles which may become mechanically detached from the anode shall reach the cathode.

Before the weighing, any traces of solution adhering to the cathode must be removed and the cathode dried.

ANNEXURE II

[See sub-rule (1) or rule 7]

SCALE OF FEES FOR COMPARISON WITH THE GOVERNMENT OF INDIA STANDARDS REFERRED TO IN SUB-RULE (1) OF RULE 2

Rs.

For an instrument intended to be used as a sub-standard and submitted for special examination and testing 80

If required to be kept under observation for a period longer than one month, for each additional month or part of a month 40

For determining a resistance of standard form to highest accuracy obtainable at one temperature 20

For determining the E.M.F. of a standard cell to highest accuracy obtainable at one temperature 15

NOTE 1: - The instruments and apparatus under test are to be delivered and removed from the Government Electrical Laboratory, Bhowanipore, Calcutta, free of cost to Government.

NOTE 2 :- In tests requiring the expenditure of a considerable amount of power, a charge to cover the actual cost of energy used may be made.

ANNEXURE III

[See rule 14]

MODEL FORM OF DRAFT LICENCE UNDER THE INDIAN ELECTRICITY ACT, 1910

[See Section 3]

Electric Licence 19.....

Draft Licence

THEELECTRIC LICENCE,..... 19

Licence for the supply of energy granted by the Government of Under the Indian Electricity Act, 1910.

Licence is hereby granted to 1a(carrying on business in partnership under the name and style of)to supply electrical energy in the area, 2a with powers and upon the terms and conditions specified below:-

Short title

1. This licence may be cited as “3a The Electrical Licence 19 _____”.

Interpretation

2. In this licence –

- (1) “The Act” shall mean the Indian Electricity Act, 1910.
- (2) The expression “the licensee” shall mean and read the said, 4a and their (or his) assigns; and
- (3) The expression “deposited maps” shall mean the plans of the area of supply hereinafter specified which has been deposited with Government in pursuance of the rules under the Act, which plans are signed for the purpose of identification by the Secretary to the Government of in theDepartment and by the applicants under the name and style of
- (4) Other words and expressions have the same meanings as are assigned to them in the Act or the rules made there under.

Security 5a

3. (1) The period within which, under Clause 1(a) of the Schedule to the Act, the licensee shall show that he is in a position fully and efficiently to discharge the duties and obligations imposed on him shall be
- (2) The period within which, under Clause 1(b) of the Schedule to the Act, the licensee shall deposit or secure such sum as therein mentioned, and the sum so to be deposited or secured, shall unless otherwise ordered by the Government under that clause be and Rupees respectively.

1a. The licensee may be any local authority, company or individual. In case of firm, give names of all the directors or partners.

2a. See clause 4.

3a. Short title to agree with heading..

4a. Names of all directors or partners as in the preamble in the case of a firm.

5a. See section 4(1)(c) of the Act and Clause I of the Schedule to the Act.

Area of supply 6a

4. The area within which the supply of energy is authorised by the licence (the area of supply) under the Act is the whole of the area bounded as follows:-

North – By

East – By

South – By

West – By

the boundaries whereof are delineated in the deposit maps.

Power to lay mains outside area of supply 1b.

5. The licensee may lay down or place electric supply-lines for the conveyance and transmission of energy from a generating station situated or to be situated at outside the area of supply to the boundary or the area of supply.

Limits within which the supply of energy is to be compulsory 2b

6. (1) The works to be executed to the satisfaction of the Government under Clause IV of the Schedule to the Act are the following namely:- 3b
(2) If the licensee fails to comply with the provisions of sub-clause (1), the licence may be revoked.*

Nature of supply

- 7.(1) The nature of supply shall beor such other as the State Government may allow.

Breaking up of streets, railways and tramways 4b.

8. The licensee is specially authorised to open and break up the soil and pavement of the following streets or parts of streets which are not repairable by the Government or by a local authority, and of the following railways and tramways or parts of railways and tramways, namely:-
(a) Streets.
(b) Railways 5b
(c) Tramways 5b

Appointment of Electrical Engineer

9. The licensee shall employ a Resident Electrical Engineer with degree or diploma in electrical engineering from a recognised University or College or Qualifications equivalent to such degree or diploma and such practical experience as the State Government may specify in this behalf.

a. The area for which each local authority is constituted should be distinctly marked or coloured. See rule 11(1)(b).

1b. This clause should be retained only where the licensee is to supply energy from a generating station outside the area of supply. Where power to cross an intervening area is sought under section 3(1) of the Act, enter details here.

* See note to sub-clause (1) of this Clause.

2b. See section 3(2)(d) of the Act.

3b. It is open to the licensee to propose a “compulsory area” or the State Government to make provision for such an area. Ordinarily it will be sufficient to enter here the names of “compulsory street” in which the licensee will lay distributing mains. If no compulsory works are specified in the licence, the State Government may subsequently direct that works are to be executed; see Clause IV of the Schedule to the Act.

4b. This clause to be omitted if no such powers are required in the licence. See section 12(5) of the Act and proviso to the same. Powers can be obtained subsequently; see rule 23.

5b. In ordinary cases the level-crossings or points at which interference is proposed must be specified.

Purchase of Undertakings

10.(1) The option of purchase given by sub-section (1) of section 6 of the Act shall be exercisable on the expiry of a period of 20 years, i.e. from the date of the notification of this licence and on the expiry of every subsequent period of 10 years 1c. The terms of such purchase shall be 2c. The percentage of the value to be determined in accordance with and for the purpose of sub-sections (1) and (2) of section 7A of the Act of the lands, buildings, works, materials and plant of the licensee therein mentioned to be added under the proviso to sub-section (4) of section 7A to such value on account of compulsory purchase shall beper cent.

(2) In accordance with clause (d) (ii) of sub-section (2) of section 3 of the Act, it is hereby declared that the generating station to be used in connection with the undertaking shall/shall not form part of the undertaking for the purpose of purchase under section 5 or section 6 3c.

Additions to variations from, and exceptions from the Schedule to the Act 4c.

11. (1) In pursuance of clause (f) of sub-section (2) of section 3 of the Act, it is hereby expressly declared that the provisions contained in the Schedule to the Act shall for the purposes of this licence be supplemented by the addition of the following clauses, namely. 5c:-

(2) In pursuance of clause (f) of sub-section (2) of section 3 of the Act it is hereby expressly declared that the clause/clauses of the schedule to the Act mentioned below shall be varied in the manner hereinafter indicated, namely 5c:

(3) In pursuance of clause (f) of sub-section (2) of section 3 of the Act it is hereby expressly declared that the clause/clauses 5c of the schedule to the Act shall be excepted from incorporation in this licence.

NOTE. – In the preparation of a draft licence the above model form may be varied, or added to, by the applicant so far as the Act and rules admit.

Rule nos. 11 to 15 (inclusive) as to applications for licences should be consulted. In drawing up a draft licence the attention of the applicant is more particularly directed to the following sections of the Act viz. 3, 4, 6, 10, 11, 12, 21, 22, 22A, 22B, 23, 27, 51 and 57; the powers under section 51 can only be conferred after the grant of the licence.

In the case of licences for bulk supply, see Clause IX of the Schedule to the Act and the proviso to Clause (f) of sub-section (2) of section 3 of the Act, also clause (b) of section 10 of the Act.

Signature of Applicant or his agent (if any)
Address of Applicant

ANNEXURE IV

[See rule 26(3)]

SUMMARY OF TECHNICAL AND FINANCIAL PARTICULARS FOR THE YEAR ENDED 31ST MARCH 19.....

Figures of the Previous year:-

TECHNICAL –

1. Year of working.
2. Area of supply in square km.

1c. The period after which an option to purchase arises may be less than 20 and 10 years, respectively.

2c. The terms must not differ from those laid down in the Act unless the powers of section 10 are invoked to modify or cancel them.

3c. The generating station or stations belonging to the licensee should ordinarily be included except where they form part of a traction undertaking previously authorised.

4c. To be omitted if not required in any draft licence.

5c. The latter part of the clause may require modification according to the circumstance.

3. Approximate population in the area of supply.

4. Installed capacity:

(a) Generating plant (excluding retired plant):

(i) Hydraulic	kW
(ii) Steam	kW
(iii) Internal combustion	kW

TOTAL	<hr/> Kw
-------	----------

(b) Receiving Station:

Transformers	kVA
--------------------	-----

5. Normal maximum demand on the system kW

6. KWh generated:

(i) Hydraulic	kWh
(ii) Steam	kWh
(iii) Internal combustion	kWh

TOTAL	<hr/> Kwh
-------	-----------

7. kWh used for Generating Station Auxiliaries.

8. KWh purchased from other agencies.

9. KWh available for sale (6-7) + 8

10. KWh supplied free (if any) to officers and staff.

11. KWh supplied free (if any) to office, canteen etc.

12. KWh sold.

13. KWh unaccounted for 9 – (10+11+12).

14. Fuel:

(a) (i) Coal and/or furnace oil consumed in tonnes	
(ii) Average calorific value per kg of coal and / or furnace oil consumed	
(iii) Average cost of coal and/or furnace oil per tonnes	
(b) (i) Oil consumed in tonnes	
(ii) Average calorific value per kg of oil consumed	
(iii) Average cost of oil per tonne	

15. Lubricating oil:

(a) Quantity consumed Litres	
(b) Average cost per litre	

16. Consumers: No. connected load kW

(a) Domestic or Residential	
(b) Commercial	
(c) Industrial	
(i) Low and medium voltage	
(ii) High and/or extra-high voltage	

TOTAL	<hr/>
-------	-------

17. Segregation of kWh sold –

- (i) Domestic or Residential:
 - (a) Lights* and Fans.
 - (b) Heating and small power.
- (ii) Commercial :
 - (a) Lights* and Fans.
 - (b) Heating and small power.
- (iii) Industrial Power:
 - (a) Low and medium voltage.
 - (b) High voltage.
- (iv) Public Lighting.
- (v) Traction.
- (vi) Irrigation.
- (vii) Public water-works and Sewage Pumping.
- (viii) Supplies in bulk to Distributing Licenses.

18. Number of persons employed on regular basis:

- (i) Technical –
 - 1. Supervisory.
 - 2. Others.
- (ii) Administrative –
 - 1. Supervisory.
 - 2. Others.

19. Length of Main Lines erected during the year –

- (i) Length of transmission lines at different voltages –
 - (a) Overhead
 - (b) Underground
- (ii) Length of distribution lines

FINANCIAL –

- 1. Share Capital (paid up)
- 2. Loan Capital (other than loans advanced by the State Electricity Board)
- 3. Licensee's Capital (1+2)
- 4. Total Capital Expenditure
- 5. Capital base [vide Paragraph XVII (1) of the Sixth Schedule to the Electricity (Supply) Act, 1948]
- 6. Reasonable Return [vide Paragraph XVII (9) of the Sixth Schedule to the Electricity (Supply) Act, 1948]
- 7. Clear Profit [vide Paragraph XVII (2) of the Sixth Schedule to the Electricity (Supply) Act, 1948]
- 8. Maximum sum permissible for distribution to share and debenture holders [vide Paragraph II (1) of the Sixth Schedule to the Electricity (Supply) Act, 1948].
- 9. Actual sum available for distribution to share and debenture holders.
- 10. Item (9) expressed as a % of item (3)
- 11. Item (9) expressed as a % of item (4)
- 12. Item (9) expressed as a % of item (5)

* Including unmetered supply.

13. Dividend declared for the year:

- (a) On ordinary shares
 (b) On preference shares

14. Market Price of shares:

- (a) Ordinary shares
 (b) Preference shares

15. Operating Revenues (vide Statement III – Annexure V)

16. Operating Expenses including depreciation (vide Statement IV – Annexure V).

17. Depreciation set apart for the year (vide Statement V – Annexure V)

18. Revenue per kWh sold (overall) (Item 15 – kWh sold)

19. Revenue per kWh sold –

- (i) Domestic or Residential
 (a) Lights* and Fans
 (b) Heating and small power
 (ii) Commercial:
 (a) Lights* and Fans
 (b) Heating and small power

(iii) Industrial Power:

- (a) Low and medium voltage
 (b) High voltage
 (iv) Public Lighting
 (v) Traction
 (vi) Irrigation
 (vii) Public Water-works and Sewage Pumping
 (viii) Supplies in bulk of Distributing Licensees

20. Cost per kWh sold (overall) (Item 16 – kWh sold)

- * Includes unmetered supply.

ANNEXURE V

MODEL FORM OF ACCOUNTS

[See Section 11 of Indian Electricity Act, 1910 and rule 26(3)]

ELECTRIC LICENCE, 19

Date of Commencement of Licence

Name of Undertaking

Year of Operation

NO. I – STATEMENT OF SHARE AND LOAN CAPITAL FOR THE YEAR ENDED 31ST MARCH, 19

(Applicable to Licensees other than Local Authority Licensees)

Description of capital	Balance at the beginning of the year	Receipt during the year	Redeemed during the year	Balance at the end of the year	Remarks
1.	2.	3.	4.	5.	6.

A. Share Capital

Authorised Capital

..... Ordinary Shares of Rs. each

.....% Preference Shares of Rs. each

	1.	2.	3.	4.	5.	6.
Issued Capital						
..... Ordinary Shares of Rs.		each				
.....% Preference Shares of Rs.		each				
Subscribed Capital						
..... Ordinary Shares of Rs.		each				
.....% Preference Shares of Rs.		each				
Called up Capital						
..... Ordinary Shares of Rs.		each				
.....% Preference Shares of Rs.		each				
Less calls in arrears						
Paid-up Capital						
..... Ordinary Shares of Rs.		each				
.....% Preference Shares of Rs.		each				
TOTAL PAID TO CAPITAL						
B. Capital Reserve
Share Forfeiture a/c
Share Premium a/c
Other items (to be specified)						
TOTAL CAPITAL RESERVE						
C. Loan Capital – Loans from State Electricity Boards						
per cent debentures of Rs.each.						
Other Loans –						
(i) Secured						
Unsecured						
TOTAL LOANS CAPITAL						
D. Other Capital						
Contribution from consumer including local authorities for						
service-lines and public lighting after the commencement of						
the Electricity (Supply) Act, 1948.						
TOTAL OTHER CAPITAL						
TOTAL CAPITAL RAISED AND APPROPRIATED						
(A+B+C+D)						

NOTE: Capital invested by proprietor, partnership, co-operative society, company etc. licensee which is interest bearing should be shown under 'C – Unsecured loans and advances, and that which is interest-free should be shown under 'D – Special items (to be specified)'.

ELECTRIC LICENCE, 19....

Date of Commencement of Licence

Name of Local Authority

Year of
Operation**NO. I(A1) – STATEMENT OF LOANS RAISED AND REDEEMED FOR THE YEAR ENDED 31ST MARCH, 19...**
(Applicable to Local Authority Licensees)

Description of loans raised from time to time	Amount Rate % sanctioned	Period of Payment <hr/> From to		Amount of Annual instalment	Amount of loan redeeme d upto the beginnin g of the year	Amount of loan redeemed during the year	Total loan redeemed upto the end of the year	Balance of loan outstandi ng at the end of the year	Remarks
1	2	3	4	5	6	7	8	9	10

 Total loans raised for the electrification scheme

NO. I(A2) – STATEMENT OF LOAN AND OTHER CAPITAL FOR THE YEAR ENDED 31ST MARCH, 19...

Particulars	Balance at the beginning of the year	Received during the year	Redeemed during the year	Balance at the end of the year	Remarks
1.	2.	3.	4.	5.	6.

1	2	3	4	5	6
A.	Capital Raised				
	Amount of loans outstanding (as per col. 10 of statement I -(AI)				
	Grants and advances made from the general funds of the local authority				
	Grants-in-aid from Government				
	TOTAL CAPITAL RAISED				
B.	Capital Reserve:				
	Loan redemption account [as per col.9 of statement IA(1) .Other items				
	(to be specified)				
	TOTAL CAPITAL RESERVE				
C.	Other Capital				
	Consumer's contributions for service lines after the commencement of the				
	Electricity (Supply) Act, 1948				
	Special items (to be specified)				
	TOTAL OTHER CAPITAL				
	TOTAL CAPITAL RAISED AND APPROPRIATED				
	(A+B+C)				

NO. II – STATEMENT OF CAPITAL EXPENDITURE FOR THE YEAR ENDED 31ST MARCH, 19....

Particulars	Balance at the beginning of the year	Additions during the year	Requirements during the year vide Col. 3 Statement II-A	Balance at the end of the year	Remarks
1.	2.	3.	4.	5.	6.

A. Intangible Assets:

1. Preliminary & Promotional expenses
2. Cost of Licence
3. Other expenses e.g., expenses incidental to conversion from DC to AC change of frequency etc.

TOTAL INTANGIBLE ASSETS

B. Hydraulic Power Plant:

1. Land & Rights
2. Buildings and civil engineering works containing generating plant and equipment
3. Hydraulic works forming part of a hydro-electric system including (i) dams, spillways, wiers, canals, reinforced concrete flumes and cyphons, (ii) reinforced concrete pipe lines and search tanks, steel pipe lines, sluice gates, steel surge tanks, hydraulic control valves and other hydraulic works
4. Water wheels, Generators and ancillary equipment including plant foundations
5. Switchgear including cable connections
6. Miscellaneous power plant equipment
7. Other civil works (to be specified)

TOTAL HYDRAULIC POWER PLANT

C. Steam Power Plant:

1. Land & Rights
2. Buildings and civil engineering works containing generating plant & equipment
3. Boiler plant and equipment including plant foundations
4. Engines, Turbines, generators and ancillary equipment including plant foundations

1	2	3	4	5	6
5. Water cooling system comprising cooling towers and circulating water systems					
6. Switchgear including cable connections					
7. Miscellaneous power plant and equipment					
8. Other civil works (to be specified)					
TOTAL STEAM POWER PLANT					
D. Internal Combustion Power Plant:					
1. Land & Rights					
2. Buildings and civil engineering works containing generating plant & equipment					
3. Engines, generators and ancillary equipment including plant foundations					
4. Water cooling system comprising cooling towers and circulating water systems					
5. Switchgear including cable connections					
6. Miscellaneous power plant and equipment					
7. Other civil works (to be specified)					
TOTAL INTERNAL COMBUSTION POWER PLANT					
E. Transmission Plant (High or Extra-High Voltage):					
1. Land & Rights					
2. Buildings and structures including civil engineering works containing transmission plant & equipment					
3. Sub-station transformers, transformer kiosks, sub-station equipment and other fixed apparatus including plant foundations:-					
(i) transformers, including foundations having rating of 100 kilovolt amperes and over					
(ii) Others					
4. Switchgear including cable connections					
5. Towers, poles, fixtures, overhead conductors and devices:-					
(i) Lines on steel or reinforced concrete supports operating at nominal voltages higher than 13.2 kilovolts					
(ii) other lines on steel or reinforced concrete supports					
(iii) lines on wood supports					
6. (i) Underground cables and devices including joint boxes and disconnecting boxes					
(ii) Cable duct system					
7. Miscellaneous equipments (to be specified)					
TOTAL TRANSMISSION PLANT					
F. Distribution Plant – High Voltage:					
1. Land & Rights					
2. Buildings and structures including civil engineering works containing distribution plant & equipment					
3. Sub-station transformers, transformer kiosks, sub-station equipment and other fixed apparatus including plant foundations:-					
(i) transformers, including foundations having a rating of 100 kilovolt amperes and over					
(ii) Others					
4. Switchgear including cable connections					

1	2	3	4	5	6
5. Towers, Poles, Ffixtures, Overhead conductors and devices:-					
(i) Lines on steel or reinforced concrete supports operating at nominal voltages, higher than 13.2 kilovolts					
(ii) Other lines on steel or reinforced concrete supports					
(iii) Lines on wood supports					
6. (i) Underground cables and devices including joint boxes and disconnecting boxes					
(ii) Cable duct system					
7. Service lines					
8. Metering equipment					
9. Miscellaneous equipments (to be specified)					
TOTAL DISTRIBUTION PLANT (HV)					
G. Distribution Plant – Medium and Low Voltage:					
1. Land & Rights					
2. Buildings and structures including civil engineering works containing distribution plant & equipment					
3. Sub-station transformers, transformer kiosks, sub-station equipment and other fixed apparatus including plant foundations:-					
(i) transformers, including foundations having rating of 100 kilovolt amperes and over					
(ii) Others					
4. Switchgear including cable connections					
5. Towers, Poles, Fixtures, Overhead conductors and devices:-					
(i) lines on steel or reinforced concrete supports					
(ii) lines on wood supports					
6. (i) Underground cables and devices including joint boxes and disconnecting boxes					
(ii) Cable duct system					
7. Service lines					
8. Metering equipment					
9. Miscellaneous equipments (to be specified)					
TOTAL DISTRIBUTION PLANT (M&LV)					
H. Public Lighting:					
Street and Signal lighting system					
I. General Equipment:					
(Not allocated to other sub-heads)					
1. Land & Rights					
2. Buildings and structures					
3. Office furniture and equipment					
4. Transportation equipment					
5. Laboratory and meter testing equipment					
6. Workshop plant and equipment					
7. Tools and work equipment					
8. Communication equipment					
9. Miscellaneous equipment					
TOTAL GENERAL EQUIPMENT					
TOTAL CAPITAL ASSETS IN USE					
NOTE - (1) Capital expenditure on items F7 and G7 should include contributions made by consumers towards service line charges.					
(2) Where it is not possible to give segregation of capital expenditure in respect of certain items and where high, medium or low voltage distribution lines are carried on same supports, the combined figures for such items may be given.					
(3) Retirements during the year referred to in Col. 4 in respect of: (i) intangible assets relate to amounts written off during the year, (ii) tangible assets relate to the original cost of assets transferred to the special account under paragraph VII of the Sixth Schedule to the Electricity (Supply) Act, 1948.					

**NO. II-A- STATEMENT SHOWING THE WRITTEN DOWN COST OF FIXED ASSETS RETIRED ON ACCOUNT OF
OBSOLESCENCE, INADEQUACY, SUPERFLUITY, ETC.**

Particulars of the assets	Written down cost of assets at the beginning of the year	Written down cost of assets retired during the year vide Col. 4 St. II less Column 8 Statement V	Written down cost of assets sold during the year	Amount realised during the year	Excess of sale proceeds over written down cost transferred to contingenci es Reserve Account vide col. 4 of Statement VI	Amount written off during the year vide Col. 6 Statement VI	Balance of written down cost at the end of the year
1	2	3	4	5	6	7	8

**NO. III – STATEMENT OF OPERATING REVENUES FOR THE YEAR ENDED 31ST
MARCH, 19.....**

Particulars of revenue	Corresponding amount for the previous year of account	Amount for the year of account	Remarks
1.	2.	3.	4.

A. Net Revenue by sale of electricity for cash & credit:

1. Domestic or Residential

(a) Lights and Fans

(b) Heating and small power

2. Commercial

(a) Lights and Fans

(b) Heating and small power

3. Industrial

(a) Low and medium voltage

(b) High voltage

4. Public Lighting

5. Public Water-works and Sewage Pumping

6. Irrigation

7. Traction

8. Supplies in bulk of Distributing Licensees

TOTAL REVENUES BY SALE OF ELECTRICITY

B. Miscellaneous Revenue from Consumers:

1. Rentals from

(a) Meters

(b) Electric motors, fittings, appliances & other apparatus
hired to consumers

2. Service Connection Fees

3. Public Lighting Maintenance

**TOTAL MISCELLANEOUS REVENUE FROM
CONSUMERS**

C. Other Revenues:

1. Sale of Stores

2. Repairs of lamps and other apparatus

3. Commission for the collection of electricity duty

4. Other miscellaneous items (to be specified)

TOTAL OTHER REVENUES

TOTAL OPERATING REVENUES

Deduct –

Total Operating expenses as per St. IV

Net surplus or deficit carried to the Net Revenue and

Appropriations account – St. X

**NO. IV – STATEMENT OF OPERATING EXPENSES FOR THE YEAR ENDED 31ST MARCH,
19.....**

Particulars of expenses	Corresponding amount for the previous year of account	Amount for the year of account	Remarks
1.	2.	3.	4.

A. HYDRAULIC POWER GENERATION

(a) Operation

1. Water for power
2. Lubricants and other consumable stores
3. Station supplies and miscellaneous expenses
4. Proportion of salaries, allowances, gratuities, etc. of Engineers, Superintendents, Officers, Supervisory and other staff
5. Wages and gratuities to labour
6. Contribution to provident fund, staff pension & apprentice & other training schemes
7. Bonus paid to the employees of the undertaking

TOTAL OPERATION

(b) Maintenance

1. Salaries for Supervisory staff
2. Buildings and civil engineering works containing generating plant and equipment
3. Hydraulic works forming part of a hydro electric system, including –
 - (i) dams, spillways, weirs, canals, reinforced concrete flumes and syphons
 - (ii) reinforced concrete pipelines and surge tanks, steel pipelines, sluice gates, steel surge tanks, hydraulic control valves and other hydraulic works
4. Water wheels, generators and ancillary equipment including plant foundations
5. Switchgear including cable connections
6. Miscellaneous power plant equipment
7. Other civil works (to be specified)
8. Contributions to Provident Fund, Staff Pension & apprentice and other training schemes
9. Bonus paid to the employees of the undertaking

TOTAL MAINTENANCE

(c) Depreciation

Depreciation to Hydraulic Power Generating Plant and Equipment (From Statement V)

**TOTAL HYDRAULIC POWER GENERATION
EXPENSES**

1.	2.	3.	4.
----	----	----	----

B. STEAM POWER GENERATION:

(a) Operation

1. Fuel (excluding sale proceeds of steam ashes etc.)
2. Lubricants and other consumable stores
3. Water (if purchased separately)
4. Station supplies and miscellaneous expenses
5. Proportion of salaries, allowances, gratuities, etc. of Engineers, Superintendents, Officers, Supervisory and other staff
6. Wages and gratuities to labour
7. Contribution to provident fund, staff pension & apprentice & other training schemes
8. Bonus paid to the employees of the undertaking

TOTAL OPERATION

(b) Maintenance

1. Salaries for Supervisory staff
2. Buildings and civil engineering works containing generating plant and equipment
3. Boiler plant and equipment including plant foundations
4. Engines, turbines, generators and ancillary equipment including plant foundations
5. Water cooling system comprising cooling towers and circulating water systems
6. Switchgear including cable connections
7. Miscellaneous power plant and equipment
8. Other civil works (to be specified)
9. Contributions to Provident Fund, Staff Pension & apprentice and other training schemes
10. Bonus paid to the employees of the undertaking

TOTAL MAINTENANCE

(c) Depreciation

Depreciation on Steam Power Generating Plant and Equipment (from Statement V)

TOTAL STEAM POWER GENERATION EXPENSES

C. INTERNAL COMBUSTION POWER GENERATION

(a) Operation

1. Fuel
2. Lubricants and other consumable stores
3. Water (if purchased separately)
4. Station supplies and miscellaneous expenses
5. Proportion of salaries, allowances, gratuities, etc. of Engineers, Superintendents, Officers, Supervisory and other staff

	1.	2.	3.	4.
6.	Wages and gratuities to labour			
7.	Contributions to provident fund, staff pension & apprentice & other training schemes			
8.	Bonus paid to the employees of the undertaking			
	TOTAL OPERATION			
(b)	Maintenance			
1.	Salaries for Supervisory staff			
2.	Buildings and civil engineering works containing generating plant and equipment			
3.	Engines, generators and ancillary equipment including plant foundations			
4.	Water cooling system comprising cooling towers and circulating water system			
5.	Switchgear including cable connections			
6.	Miscellaneous power plant equipment			
7.	Other civil works (to be specified)			
8.	Contributions to Provident Fund, Staff Pension & apprentice and other training schemes			
9.	Bonus paid to the employees of the undertaking			
	TOTAL MAINTENANCE			
(c)	Depreciation			
	Depreciation on internal Combustion Power Generating Plant and Equipment (From Statement V)			
	TOTAL INTERNAL COMBUSTION POWER GENERATION EXPENSES			
D.	POWER PURCHASED:			
	TOTAL PRODUCTION EXPENSES (A+B+C+D)			
E.	TRANSMISSION (HIGH OR EXTRA-HIGH VOLTAGE)			
(a)	Operation and Maintenance:			
1.	Proportion of salaries, allowances, gratuities, etc. of Engineers, Superintendents, Officers, Supervisory and other staff			
2.	Wages and gratuities to sub-station labour			
3.	Wages and gratuities to labour on lines			
4.	Buildings and structures including civil engineering works containing transmission plant & equipment			
5.	Sub-station transformers, transformer kiosks, sub-station equipment and other fixed apparatus including plant foundations:-			
(i)	Transformers including foundations having rating of 100 kilovolt amperes and over			
(ii)	Others			
6.	Switchgear including cable connections			

	1.	2.	3.	4.
7. Towers, poles, fixtures, overhead conductors and devices:-				
(i) Lines on steel or reinforced concrete supports operating at nominal voltages higher than 13.2 kilovolts .				
(ii) other lines on steel or reinforced concrete supports .				
(iii) lines on wood supports				
8. (i) Underground cables and devices including joint boxes and disconnecting boxes				
(ii) Cable duct system				
9. Contributions to Provident Fund or Staff Pension .				
(b) Depreciation on Transmission Plant and equipment (from Statement V) .				

TOTAL TRANSMISSION EXPENSES

F. DISTRIBUTION (HIGH VOLTAGE):

(a) Operation and Maintenance:

1. Proportion of salaries, allowances, gratuities, etc. of Engineers, Superintendents, Officers, Supervisory and other staff				
2. Wages and gratuities to sub-station labour				
3. Wages and gratuities to labour for mains				
4. Buildings and structures including civil engineering works containing transmission plant & equipment				
5. Sub-station transformers, transformer kiosks, sub-station equipment and other fixed apparatus including plant foundations:-				
(i) transformers, including foundations having rating of 100 kilovolt amperes and over				
(ii) Others				
6. Switchgear including cable connections				
7. Towers, poles, fixtures, overhead conductors and devices:-				
(i) Lines on steel or reinforced concrete supports operating at nominal voltages higher than 13.2 kilovolts .				
(ii) other lines on steel or reinforced concrete supports .				
(iii) lines on wood supports				
8. (i) Underground cables and devices including joint boxes and disconnecting boxes				
(ii) Cable duct system				
9. Service lines				
10. Metering equipment				
11. Contributions to Provident Fund or Staff Pension .				
(b) Depreciation on Distribution Plant and equipment (from Statement V)				

TOTAL DISTRIBUTION (H.V.) EXPENSES

G. DISTRIBUTION MEDIUM AND LOW VOLTAGE:

(a) Operation and Maintenance:

1. Proportion of salaries, allowances, gratuities, etc. of Engineers, Superintendents, Officers, Supervisory and other staff				
--	--	--	--	--

	1.	2.	3.	4.
2.	Wages and gratuities to labour			
3.	Buildings and structures including civil engineering works containing transmission plant & equipment			
4.	Sub-station transformers, transformer kiosks, sub-station equipment and other fixed apparatus including plant foundations:-			
(i)	transformers including foundations having rating of 100 kilovolt amperes and over			
(ii)	Others			
5.	Switchgear including cable connections			
6.	Towers, poles, fixtures, overhead conductors and devices:-			
(i)	Lines on steel or reinforced concrete supports			
(ii)	Lines on wood supports			
7. (i)	Underground cables and devices including joint boxes and disconnecting boxes			
(ii)	Cable duct system			
8.	Service lines			
9.	Metering equipment			
10.	Contributions to Provident Fund or Staff Pension			
(b)	Depreciation on Distribution Plant and equipment (from Statement V)			
	TOTAL DISTRIBUTION (M. & L.V.) EXPENSES			
H.	PUBLIC LIGHTING:			
(a)	Operation and maintenance			
1.	Operation and maintenance			
2.	Renewal of lamps			
(b)	Depreciation on P.L. System and equipment (from Statement V)			
	TOTAL PUBLIC LIGHTING EXPENSES			
I.	CONSUMERS' SERVICING, METER READING, BILLING, COLLECTING, ACCOUNTING, SALES PROMOTING, ETC.			
1.	Proportion of salaries, allowances, gratuities, etc. of Engineers, Secretary, Accountants, other Officers etc.			
2.	Meter reading and inspection			
3.	Billing, collecting and accounting			
4.	Exhibition, demonstrations and advertisements			
5.	Merchandising, servicing and contract work			
6.	Miscellaneous expenses			
7.	Contributions to Provident Fund or Staff Pension			
8.	Depreciation on general assets and equipment, which are not allocated to other sub-heads (From Statement V)			
	TOTAL CONSUMERS' SERVICING, METER READING, ETC. EXPENSES			

	1.	2.	3.	4.
J. GENERAL ESTABLISHMENT CHARGES:				
1. Proportion of salaries, allowances, gratuities, etc. of general officers, executives etc.				
2. Salaries, wages, gratuities, etc. of general office staff				
3. Contribution to local authority administration for Supervision (applicable to local authority licensee only)				
4. Travelling and other expenses of officers and staff				
5. Rents and Way leaves				
6. Rates and Taxes				
7. General Office expenses and showroom maintenance and supplies				
8. Repairs to office buildings, staff quarters, furniture and fixtures, office equipment etc. and maintenance				
9. Depreciation on office and general buildings, furniture etc. not allocated to other sub-heads (from Statement V)				
10. Audit Services:				
(a) Auditor of company				
(b) Auditor appointed under the provisions of the Act				
11. Legal services				
12. Insurance expenses				
13. Contribution to Provident Fund, staff pension and apprentice and other training schemes				
14. Bonus paid to the employees of the undertaking				
TOTAL GENERAL ESTABLISHMENT CHARGES				
K. OTHER CHARGES:				
1. Interest paid and accrued on:				
(a) Loans advanced by the State Electricity Board				
(b) Depreciation fund				
(c) Consumer's Security Deposit				
2. Bad debts written off				
3. Other items (to be specified)				
TOTAL OTHER CHARGES				
L. MANAGEMENT EXPENSES				
1. Directors' fees and expenses and Debenture Trustees' fees, if any				
2. Other expenses				
TOTAL MANAGEMENT EXPENSES				
TOTAL OPERATING EXPENSES TRANSFERRED TO STATEMENT – III				

NOTE – (1) No appointment of expenses under sub-head 'L' be made to any of the salary items under A(a), 4, B-(a)5, C-(a)5, E-8(a)1, F(a)1, G(a)1, J-1 and K-1, which shall include the proportion of salaries and allowances of persons solely employed for the purpose of the undertaking and of the engineering staff employed by the Managing Agents under the provision of sub-para (3) of Para XIII of the Sixth Schedule to the E(S) Act, 1948.

(2) Managing agent in this context refers to the managerial personnel as given in the explanation under paragraph XIII of the Sixth Schedule to the Electricity (Supply) Act, 1948.

NO.V – STATEMENT FOR PROVISION FOR DEPRECIATION FOR THE YEAR ENDED 31ST MARCH, 19...

Description of assets in Groups as per Statement II	Balance of accrued depreciation brought forward from last account	Balance of arrears of depreciation brought forward from last account	Additions during the year				Withdrawals during the year vide col.3 Statement II-A	Balance of accrued depreciation carried over to next account	Balance of arrears of depreciation carried over to next account	Remarks
			Interest @ 4% per annum on the balance at the beginning of the year under para VI(I) of the Sixth Schedule to the E(S) Act 1948	Depreciation provided for the year	Arrears of depre- ciation written off during the year	Total				
1	2	3	4	5	6	7	8	9	10	11

- A. Hydraulic Power Plant:
 B. Steam Power Plant
 C. Internal Combustion Plant:
 D. Transmission Plants, High or Extra-High Voltage
 E. Distribution Plant, High Voltage:
 F. Distribution Plant, Medium and Low Voltage
 G. Public Lighting
 H. General Equipment

Total

NOTE – 1. Withdrawals from the depreciation account are permissible only to the extent of past provisions made in respect of assets withdrawn from use and transferred during the year to the special account under Para VII of the Sixth Schedule to the E(S) Act, 1948.

2. A sum of Rs. from the accruals in the depreciation account has been invested in securities in pursuance of the provision of paragraphs XVII (i) (d) of the Sixth Schedule to the E(S) Act, 1948.

NO. VI – STATEMENT OF CONTINGENCIES RESERVE FOR THE YEAR ENDED 31ST MARCH, 19....

Particulars	Balance at the beginning of the year	Additions during the year			Withdrawals during the year			Balance at the end of the year	Remarks
		Appropriations during the year	Additions under paragraph IX of the Sixth Schedule to the E(S) Act, 1948 vide Col.6 Statement II-A	Total	Amount written off under sub-para (2) of para VII of the sixth Schedule to the E(S) Act, 1948, vide Col.7 Statement II-A	Expenses and/or compensation under para V, sixth Schedule to the Electricity (Supply) Act 1948.	Total		
1	2	3	4	5	6	7	8	9	10

NOTE – A sum of Rs. from the balance of the Contingencies Reserve has been invested under the provisions of paragraph IV (2) of the Sixth Schedule to the Electricity (Supply) Act, 1948.

NO. VII – STATEMENT OF DEVELOPMENT RESERVE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 19....

Balance at the beginning of the year	Development rebate for the year permissible under the Indian Income Tax Act, 1961 (As per details attached)	Development reserve permissible for the year under the para VA(1) of the Sixth Schedule to the E(S) Act, 1948 being the amount of relief on Income-tax & Super-tax on the amount of development rebate	Actual appropriation made under the proviso to para VA(1) of the Sixth Schedule to the E(S) Act, 1948 .	Unabsorbed development reserve to be appropriated in future years under paragraph VA(2) of the Sixth Schedule to the Electricity (Supply) Act, 1948.					Balance at the end of the year Col. (1+4+ 8)	Remarks
				Balance at the beginning of the year	Current Year's balance Col. (3-4)	Total	Instal-ment appropriated during the year	Balance awaited adjustment Col. (7-8)		
1	2	3	4	5	6	7	8	9	10	11

NO. VIII – STATEMENT OF TARIFFS AND DIVIDENDS CONTROL RESERVE ACCOUNT FOR THE YEAR ENDED 31ST MARCH, 19....

Particulars	Balance at the beginning of the year	Appropriated during the year	Withdrawn during the year (purpose to be indicated in the Remarks column)	Balance at the end of the year	Remarks
1.	2.	3.	4.	5.	6.

**NO. IX – STATEMENT OF CONSUMER’S REBATE RESERVE ACCOUNT FOR THE YEAR ENDED
31ST MARCH, 19....**

Particulars	Balance at the beginning of the year	Distributed to the consumers during the year under paragraph II(I) of the Sixth Schedule to the E(S) Act, 1948	Appropriated during the year	Balance at the end of the year	Remarks
1.	2.	3.	4.	5.	6.

**NO. X – STATEMENT OF SPECIAL APPROPRIATIONS PERMITTED BY STATE GOVERNMENT
FOR THE YEAR ENDED 31ST MARCH, 19....**

Particulars giving reference to the sanction of the State Government permitting the appropriation	Balance at the beginning of the year	Additions by way of appropriation during the year	Transfer by way of re-appropriation during the year (details to be given in the Remarks column)	Balance at the end of the year	Remarks
1.	2.	3.	4.	5.	6.

**NO. XI – STATEMENT OF NET REVENUE AND APPROPRIATIONS ACCOUNT FOR THE
YEAR ENDED 31ST MARCH, 19...**

Corresponding figures of the previous year	Particulars	Amount	Corresponding figures of the previous year	Particulars	Amount
1.	2.	3.	4.	5.	6.
1.	To Balance of loss brought forward from last account		1.	By Balance of profit brought forward from last account	
2.	To net operating deficit as per Statement III		2.	By net operating surplus as per Statement III	
3.	To appropriations (applicable to local Authority Licensee only):-		3.	By interest on securities and investments	
(a)	Interest on loan capital		4.	By other receipts (non-operating e.g, rents) Less outgoings not otherwise provided for transfer fee etc. (to be specified).	
(b)	Instalment of redemption of loan capital, as per (col.8 of St.I(A)(I).		5.	Adjustment in respect of excess provision of income-tax.	
(c)	General Rates.				
4(a)	Provision for taxes on Income and profit for the year Rs.		6.	By Balance of loss carried over	
(b)	Additional short provision in respect of year 20 Rs.				
5.	To instalment of write-down in respect of intangible assets.				
6.	To instalment of contribution towards arrears of Depreciation as per Statement V – Column 6.				
7.	To contribution towards Contingencies Reserve as per Statement VI – Column 3.				
8.	To appropriation towards development Reserve as per Statement VII – Column 4 or 8 or 4+8.				
9.	To appropriation to Tariffs and Dividends Control Reserve, as per Statement VIII – Column 3.				
10.	To appropriation to Consumers' Rebate Reserve as per Statement IX – Column 4.				
11.	To other special appropriation permitted by the State Government as per Statement X – Column 3.				
12.	To appropriation towards interest paid and accrued and dividends paid and payable:-				
(a)	Interest on debentures.				

- (b) Interest on loans borrowed from the organisation or Institution approved by the State Government.
- (c) Interest on other secured loans.
- (d) Interest on unsecured loans, advances, deposits, bank overdrafts, etc.
- (e) Dividends on preference share capital.
- (f) Dividends on ordinary share capital.
To balance of profit carried over.

NO. XII – GENERAL BALANCE SHEET AS ON 31ST MARCH, 19...

Corresponding figures of the previous year	Particulars	Amount	Corresponding figures of the previous year	Particulars	Amount
1.	2.	3.	4.	5.	6.
1.	Capital raised and appropriated vide Statement I or I-A Reserve and Surplus.		1.	Capital amount expended on works in use – Statement – II. Less – Accumulated provisions for depreciation – Statement V. Net Block.	
2.	Non-statutory Reserve		2.	Balance of written down cost of obsolete, inadequate etc. assets – Statement – IIA, Current Assets.	
3.	Contingencies Reserve Fund as per Statement No. VI		3.	Capital Works in progress.	
4.	Development Reserve as per Statement VII.		4.	Stores and materials in hand- (a) Fuel-Coal and/or etc. at cost. (b) General Stores at or below cost.	
5.	Tariffs & Dividends Control Reserve as per Statement VIII.		5.	Debtors for amounts paid in advance on account of contracts.	
6.	Consumers' Rebate Reserve as per Statement IX.		6.	Sundry debtors for electricity supplied.	
7.	Special appropriations (as permitted by the State Government) reserve as per Statement X.		7.	Other debtors (as per the Schedule attached).	
8.	Balance of Net Revenue and Appropriations Account as per Statement XI. Current liabilities and Provisions		8.	Accounts receivable (to be specified)	

1.	2.	3.	4.	5.	6.
9. Balances due on construction of Plant, Machinery, etc.			9. Investments in statutory securities of cost.		
			(a) Contingencies Reserve Fund Investment. (Market value on closing date).		
			(b) Depreciation Reserve Fund Investment. (Market value on closing date).		
			(c) Other Investments. (Market value on closing date).		
10. Creditors of open accounts (as per schedule attached).			10. Special deposits:		
			(a) In respect of taxation.		
			(b) Others (to be specified).		
11. Consumers' Security deposits:			11. Balance at Bank:		
(a) In Cash Rs.			(a) Deposit account.		
(b) In Securities Rs.			(b) Current account and at call.		
12. Accounts payable (to be specified)			12. Cash in hand Debits Balances		
13. Temporary accommodations, bank overdrafts and other finances.			13. Net Revenue and Appropriations Account balance at debit thereof Statement XI.		
14. Other current and accrued liabilities (to be specified).			14. Deferred payments.		

NOTE- Contingent liabilities and outstanding commitments, if any, to be stated on the face of this balance sheet.

ANNEXURE VI

(See Rule 27)

MODEL FORM OF DRAFT CONDITIONS OF SUPPLY

Name of undertaking

PART – I

- General-**(a) "The Act" means the Indian Electricity Act, 1910 as in force from time to time.
(b) "Licensee" means
(c) "Consumer" means any person who is supplied with energy by the licensee or whose premises are for the time being connected for the purpose of supply of energy with the works of the licensee.
(d) "Date of presentation" means the second day after the date of any bill rendered by the licensee.
- Application and agreement for supply.**- (a) Application and agreement for supply of electrical energy shall be made in the form attached hereto (Appendix 'A') obtainable free of cost at the local office of the licensee. The application shall be signed by the owner or occupier of the premises for which supply is required. Any

assistance and information required for filling up the form will be given to the applicant at the local office of licensee.

(b) If the supply is required for motors the applicant shall state the purpose for which the motors are required.

3. **Notice before connection.** – The intending consumer must give at least one month's notice before the supply is required.

4. **Notice for fixing the position of service, meter, etc.** – Upon receipt of the requisition for supply seven clear days' notice shall be sent by the licensee, to the applicant for supply or to the contractor acting on his behalf, for his representative to meet the engineer of the licensee for the purpose of inspecting the premises and fixing the point of entry of supply mains and the position of the mains, cut-outs or circuit breakers and meters. The licensee will, in no case, fix meters and main cut-out, nor allow the same to remain in any position which entails entry of his employees into purdah or religious quarters.

5. **Quotations, etc., for laying –Service lines.** – (a) The position for the service having been agreed upon as provided for in condition No.4 above, the licensee shall thereafter submit to the applicant a quotation of the estimate of the cost of carrying out the work. The quotation having been accepted, the applicant shall be required to deposit the amount of the estimate with the licensee before the service is laid. The deposit having been duly paid, orders shall be issued for the work to be put in hand and the amount so deposited shall be subsequently adjusted, if necessary, or compilation of the figures of the actual cost of the service line. Other conditions being equal, service lines shall as far as possible be laid in the order of the dates or receipt of the deposit money.

NOTE.- The service line, notwithstanding that a portion of the cost has been paid for by the consumer, shall remain the property of the licensee by whom it is to be maintained.

(b) If a consumer desires to have the position of the existing service line altered the licensee shall carry out the work and charge the consumer the cost of the additional material used and the labour employed plus 15 per cent of the latter as supervision charges.

(c) Service lines for temporary illumination shall be laid by the licensee where possible and the cost incurred in laying and removing such service lines as determined in the manner laid down in clause (b) above shall be paid by the consumer.

(d) Where any difference or dispute arises as to the cost of fixing of the position of service lines, the matter shall be referred to the Electrical Inspector for and shall be decided by him.

(e) A consumer requiring high voltage supply must provide and maintain at his expenses a locked and weather proof enclosure of agreed design, for the purposes of housing the licensee's metering equipment. Such an enclosure may be used by the consumer for his own similar metering equipment but for no other purposes.

6. **Service Lines.** – The licensee shall lay free of charge 30 metres of service line from his nearest distribution main outside the limits of the property in respect of which the requisition is made. Any length in excess of 30 metres, as defined above and the whole of the service line within the limits of the property in respect of which application is made shall be paid for by the applicant. The cost mentioned above, however, shall be exclusive of the proportionate cost of the first pole and fittings beyond 30 mts. aforesaid. The proportionate cost of such poles and fitting shall be in the same ratio as 30 metres is to the length of the line beyond 30 metres from the point of tap-off of the service and the second support of the service line.

The main cut-outs or fuses shall be inserted and sealed by the licensee free of cost to the consumer.

7. **Consumer not to interfere with the supply mains or apparatus.** – The meter boards, main cut-outs, etc. must on no account be handled or removed by any one who is not in the

employ of the licensee. The seals which are fixed on the meters and the licensee's apparatus must on no account be broken.

8. **Wiring on consumer's premises.** – For the protection of the consumer and the public generally, it is necessary that the wiring on the consumer's premises should conform to the IE Rules and the Rules of the Fire Insurance Company in term of which the building is insured and be carried out by a licensed electrical contractor. The material used for wiring shall comply with the standards laid down in that behalf by the Bureau of Indian Standards or equivalent. As soon as the consumer's installation is completed in all respects and tested by the consumer's contractor, the consumer should submit to the licensee the wiring contractor's completion and test report. A form for this purpose shall be supplied by the licensee. It is important that the conditions named herein are fully complied with as otherwise there will be delay in obtaining the supply.

As required by rule 45 of the Indian Electricity Rules, 1956, no electrical installation work (including additions, alterations, repairs and adjustments to existing installations), except such replacement of lamps, fans, fuses, switches, low voltage domestic appliance and fittings as in no way alter the capacity and the character of the installation, shall be carried out upon the premises on behalf of any consumer or owner for the purposes of supply of energy to such consumer or owner, except by an electrical contractor licensed by the in this behalf and under the direct supervision of a person holding a certificate of competency issued or recognised by the Any person committing a breach of rule 45 shall render himself liable to punishment under rule 139 of the said Rules.

9. **Apparatus on consumer's premises.** – (a) All transformers, switch gear and other electrical equipment belonging to the consumer and connected to the mains of the licensee shall be maintained to the reasonable satisfaction of the licensee.
- (b) In the case of high voltage consumers, suitable protective devices approved by the licensee shall be used so as to afford full protection to the licensee's apparatus placed on the consumer's premises.
10. **Procedure for testing installation by licensee and fee.** – (a) Upon receipt of the test report the licensee shall notify to the applicant the time and the day when the licensee's representative proposes to inspect and test the installation. It will then be the duty of the applicant to arrange the representative of the wiring contractor employed by him is present at the inspection to give the licensee's representative any information that may be required by him concerning the installation.
- (b) No connection shall be made until the consumer's installation has been inspected and tested by the licensee and found satisfactory. No charge shall be made for the first test made by the licensee but subsequent tests due to faults disclosed at the initial test shall be charged for in accordance with part III of these conditions. Periodical tests of the installation will also be undertaken by the licensee at rates that may be ascertained from his local office.
- (c) Before taking the insulation test of the installation the wiring must be completed in all respects. All fittings, whether incandescent lamps, fans, motors, heating, cooking or other apparatus, must be connected to the conductors and all fuses must be in place and all switches switched in the 'on' position before the tests are carried out. Temporary wires or fittings or dead ends should not be included in the installation and no part of the work should be left incomplete.
- (d) A pressure of 500 volts will be applied between installation and "earth" and the insulation resistance to earth after one minute's electrification shall be such as will not cause a leakage from the installation exceeding one five thousandth part of the maximum current demanded.
- (e) The test between the poles should give at least half the result of that to "earth".
- (f) Manufacturer's test certificates in respect of all high voltage apparatus shall be produced if required by the licensee.

11. **Extensions and alterations.** – Should the consumer, at any time after the supply of energy has been commenced increase the number or size of lights, fans or motors, etc. on his premises or in any way alter the position of his wiring therein, notice thereof must be sent in writing to the licensee whose representative will call and inspect the alteration and, if necessary, change the meters and fuses and alter the service line. Failure to give such notice may derange the supply system and render the supply liable to be summarily discontinued. During such time as alterations, additions or repairs are being executed, the supply to the circuit which is being altered, added to or repaired must be entirely disconnected and it shall remain disconnected until the alterations, additions or repairs have been tested and passed by the licensee.
12. **Failure of supply.** – (a) Should at any time the licensee's service fuse or fuses fail, notice thereof should be sent to the licensee's local office or if there are sub-stations, to the nearest sub-station. Only authorised employees bearing the badge of the licensee are permitted to replace these fuses in the licensee's cut-outs. Consumers are not allowed to replace these fuses and they will render themselves liable to a heavy penalty if the licensee's seals placed to protect his apparatus are broken. The licensee does not allow his employees to carry out any repair or replacement of fuses in the consumer's installation.
(b) The licensee shall not be liable for any claims for loss, damage or compensation whatsoever arising out of failure of supply when such failure is due either directly or indirectly to war, mutiny, civil commotion, riot, strike, lock-out, fire, tempest lightning, earthquake or other force, accident or cause beyond his control.
13. **Access to premises and apparatus.** – The licensee's servant possessing a written authority signed by the engineer or manager or the licensee are entitled at all reasonable time and on informing the occupier to enter the premises to which the energy is supplied for the purpose of inspecting meters and for other purposes connected with the apparatus belonging to the licensee.
14. **Security Deposit.**– The licensee may require any consumer to deposit security for the payment of his monthly bills for energy supplied and for the value of the meter and other apparatus installed in his premises. No interest will be allowed in deposits up to Rs.25. Interest at the rate of per cent per annum will be paid by the licensee on deposits exceeding Rs.25.
The licensee shall be at liberty at any time to apply any security deposited towards payment or satisfaction of any money which shall become due or owing by the consumer. The licensee shall also be at liberty to demand enhanced security deposit from consumers at any time during the life of the contract. The balance of the security deposit will be returned to the consumer on the termination of the contract.
The consumer may at any time, with the previous consent of the licensee transfer the contract and its liabilities to any other person approved by the licensee.
15. **Method of charging for current.** –(a) The price and method of charging for current supplied shall be such as may be fixed by the licensee from time to time subject to the provisions of the Electricity (Supply) Act, 1948.
(b) Unless specified otherwise all rates refer to one point supply.
16. **Payment of bills.** – (a) Bills should be paid at the licensee's local office within 15 days from the date of their presentation.
(b) Any complaints with regard to the accuracy of the bills shall be made in writing to the licensee and the amounts of such bills shall be paid under protest within the said period of 15 days. The amounts of bills paid under protest will be regarded as advance to the credit of the consumer's account until such time as the bills in dispute have been fully settled.
(c) If the consumer fails to pay any bills presented to him within the said period of 15 days, the licensee shall be at liberty to take action under sub-section (1) of section 24 of the Act and to cut-off the supply after giving such consumer not less than 7 clear days' notice in writing

without prejudice to his right to recover the amount of the bill by suit. Where, however, any difference or dispute has been referred under the Act to the Electrical Inspector for before notice aforesaid has been given by the licensee, the licensee shall not be at liberty to cut-off the supply for failure to pay the bill except where the licensee has made a request in writing to the consumer that the amount in dispute should be deposited with the said Electrical Inspector and the consumer has failed to comply with such request.

17. **Notice of removal.** – (a) Consumers about to vacate or sublet their premises should give to the licensee a seven clear days' notice in writing, together with an opportunity for disconnecting the premises, otherwise the licensee cannot guarantee that the meter readings will be taken on the required date. Failing such notice, the consumer will be held responsible for energy consumed on the premises in respect of which the licensee holds agreement for the supply of energy until the expiration of seven days from the day on which the notice of removal in writing has been received at his office.
- (b) Consumers leaving the station for a period exceeding two months and closing their houses while away, or those houses remain closed and unoccupied owing to non-tenancy for the same period are requested to inform the licensee before-hand so that the meters installed at the premises may be read, installations disconnected and the licensee's property removed if agreed to between the licensee and the consumer or otherwise to notify the licensee where the key can be obtained to enable the licensee's engineer to remove, the fuses whenever it is desired to test the distribution mains in the consumer's district. In such cases consumers will not be charged the monthly minimum provided that:-
 - (i) the rental of meter or meters of the licensee shall be paid so long as they remain on the consumer's premises if the meters are removed, the charges as provided for in Part III will be payable for removing and refixing the meters;
 - (ii) the consumer agrees to the extension of the term of the agreement by the period by which the monthly minimum charge has been waived if the period of his contract had not expired;
 - (iii) a reconnection fee as provided in part III is paid before reconnection.

Should the consumer require reconnection before the expiry of two months, both the reconnection fee and the monthly minimum charge will have to be paid by the consumer. The life of the contract will not be extended in such cases.
- (c) When a consumer leaves his installation connected to the licensee's mains, but locks up the meter or otherwise makes it inaccessible for reading by the employees of the licensee, for the first month of such inaccessibility the consumer will be charged the monthly minimum. If in the next month the meter is accessible for reading, the consumer will be charged the actual consumption less the above minimum, but subject to the monthly minimum. If on the other hand the meter remains inaccessible in the second month also the consumer will be served with 24 hours' notice (section 20 of the Act) to open his premises for the reading of the meter by any employee of the licensee at a fixed time and date; the meter is now made available for reading, the consumer will be charged the actual consumption less the minimum charged or paid for the first month of inaccessibility subject to monthly minimum. If the meter remains inaccessible even after 24 hours' notice, the premises will be disconnected. For that month also the monthly minimum charge will be charged to the consumer. If the meter is made accessible subsequent to the disconnection for purposes of reading the meter and settling accounts or for reconnection of the service, as the case may be the consumer will be charged the actual consumption less the two minima or paid for the two months of inaccessibility subject to the proportionate minimum for the period of inaccessibility of the meter upto the time of disconnection. If the consumer applies for reconnection, fees under clause B.I of part III of these conditions will be collected before reconnection.
18. **Accuracy of meters.**– Should the consumer dispute the accuracy of any meter which is not his own property, he may, upon giving notice and paying the prescribed fee, have the meter

tested by the licensee or the Electrical Inspector, in accordance with section 26 of the Act. In the event of the meter being tested by the licensee and found to be beyond the limits of accuracy as prescribed in the Indian Electricity Rules, in force from time to time; the testing fee shall be returned and the amount of the bill adjusted in accordance with the result of the test taken with respect to the meter readings of the three months prior to the month in which the dispute has arisen, due regard being paid to conditions of occupancy during the months. In the event of the test being undertaken by the Electrical Inspector for and the meter being found to be incorrect, the period during which the meter shall be deemed to have been incorrect, and the amount of energy supplied to the consumer during this period shall be decided by the Electrical Inspector for where decision shall be final. Rent for the meter for the period it is found inaccurate will not be charged by the licensee.

The licensee may remove the meter for the purpose of testing it in his laboratory.

19. **Discontinuance of Supply.** – (a) If any consumer adopts any electrical appliance which is likely to affect injuriously the supply to other consumers or uses the energy supplied or deals with it in any manner so as to unduly or improperly to interfere with the efficient supply of energy to any other person by the licensee or fails to keep in proper order any meter belonging to him by which the supply is registered, the licensee may discontinue the supply so long as such an appliance is so adopted or the energy is so used or dealt with or the meter is not kept in proper order, and as the case may be.
- (b) The licensee shall not be bound to give or continue the supply if the Electrical Inspector for or other competent person appointed by the Government is satisfied that the electric supply-lines, fittings, works or any other apparatus within the said premises are not in good order and condition and are likely to effect injuriously the use of energy by the licensee or by other persons.
- (c) Any consumer who after having been duly notified, refuses to permit or fails to give an authorised representative of the licensee, reasonable facilities to enter any premises to which energy is, or has been supplied for the purpose of testing or inspecting the installation of the consumer, shall be liable to have the electricity supply discontinued after the expiry of 24 hours' notice in writing in accordance with section 20 of the Act.
20. **System of supply.** – Supply of energy shall be given by the licensee on the following systems, namely:-
 - (i) Low voltage – Direct current, two wire or Alternating current single phase, 50 cycles;
 - (ii) Medium voltage - Direct current, three wire, or Alternating current, three phase, 50 cycles;
 - (iii) High voltage – Alternating current, three phase, 50 cycles.
21. **Classification of installations.** – A.C. System. (a) Two wire single phase, 230 volts –
 - (i) General supply not exceeding 10 amperes.
 - (ii) Motive power installations up to 1 BHP in aggregate.
- (b) Four-wire, three phase, 230 volts between phase wires and neutral general supply exceeding 10 amperes.
- (c) Three-wire, three phase, 400 volts between phases- Motive general supply exceeding 10 amperes.
- D.C. system. (a) Two-wire 130 volts –
 - (i) General supply not exceeding 10 amperes.
 - (ii) Motive power installations up to 1 BHP in aggregate.

- (b) Three-wire 460 volts between outers - Motive power installations of over 1 BHP.
22. **General Wiring Conditions.** – (a) **Mains.** – The consumer's mains shall in all cases be brought back to the licensee's point of supply and sufficient cable shall be provided for connecting up with the licensee's apparatus.
- (b) **Switches and Fuses.** – The consumer shall provide linked quick break main switches and a single pole fuse on each conductor except the neutral conductor which shall be fixed as near as possible to the licensee's meter board.
- (c) **Balance of installation.** – If the connected load of any installation exceeds 10 amperes at 230 volts, the installation shall be wired on the group system separate neutral wires being brought back in each case to the licensee's point of supply. An approved type of double pole linked switch shall control each main circuit. The lamps, fans or any other apparatus of which the installation consists shall be so grouped that under normal working conditions the current will be balanced and no current will be following in the neutral wire.
- (d) **Medium voltage supply.** – With medium voltage supply, i.e., above 250 volts and up to 650 volts, the licensee's meter and service cut-outs shall be enclosed in a strong teak-wood box suitably ventilated and provided with a hasp staple and lock. All wires between which a difference of potential of over 250 volts exists shall be made inaccessible to unauthorised persons or enclosed in an earthed metallic casing or conduit. A "Caution" Board printed in Hindi and the local language of the district shall be fixed thereto.
- (e) **Overhead Mains.** – In order to save the expense of a long underground service on private property, a consumer may, with the licensee's approval erect a pillar on that portion of his property which is nearest to the licensee's supply mains into which the service shall be laid and from which the consumer shall run overhead mains to his premises. These overhead mains shall constitute a portion of his installation and shall be laid in compliance with the Indian Electricity Rules in force from time to time. An efficient chocking coil and lightning arrestor may be fixed at the commencement of the overhead line at the consumer's cost should he desire the same, as an additional protection for his installation.
- (f) **Earthing.** – Gas pipes shall on no account be used for earthing purposes.
- (g) **Domestic heating and cooking.** – A special circuit for heating and cooking shall be run from the licensee's point of supply. Wall plugs used on these circuits shall be of the three pin type, the third pin being an earth connection. Two pin plugs or lighting sockets shall not be allowed. All appliances used in the bathroom for heating or washing purposes or in any damp location must be effectively earthed.
- (h) **Plugs.** – All plugs shall be switched on the live wire and not on the neutral.
- (i) **Wiring.** – Single leads shall not be allowed to be run separately in iron conduit.
- (j) **A.C. Motor installation.** – Motors shall be provided with control gear so as to prevent satisfactorily the maximum current demand from the consumer's installation exceeding the limits given in the following schedule at any time under all possible conditions. Failure to comply with these regulations will render the consumer liable to disconnection from the supply on account of interference with the supply to other consumers:-

Nature of supply	Size of installation	Limit of maximum current demanded
Single phase	Upto and including 1 BHP	Six times full load current.
Three phase	Above 1 BHP and upto and including 10 BHP	Three times full load current .
	Above 10 BHP and upto and including 15 BHP	Twice full load current.
	Above 15 BHP	One and a half time full load current.

Motor circuits shall be controlled by a triple pole linked switch protected by a no volt release and T.P. fuses (or over load releases). It is important that the release should be maintained in thorough working order. Wiring for motors shall be run with all three phase wires bunched in a single metallic conduit, which shall be efficiently earthed throughout and connected to the frame of the motor from which two separate earth wires shall be run. The minimum size of the earthwire permitted is No. 14 S.W.G. All motors shall comply in every respect with the Indian Electricity Rules, in force from time to time.

Motors above 1 BHP shall be wound for three-phase, 400 volts between phases.

- (k) **Power Factor of Apparatus.**- The apparatus shall have a power factor of not less than 85 per cent at normal working load.

Intending consumers are advised to consult the Engineer of the licensee before ordering their motors, as in some cases it may be practicable to relax the starting current limit dependent on the location and conditions of working.

23. **Saving rights.** – Nothing in these conditions shall abridge or prejudice the rights of the licensee and the consumer under the Indian Electricity Act, 1910, or any rules thereunder and Electricity (Supply) Act, 1948.

PART II

SCHEDULE OF RATES

(To be filled in by the licensee)

PART III

SCHEDULE OF SERVICE & MISCELLANEOUS CHARGES

- A. **Charges for service line.** – 30 metres of service line from distributing mains, but not on the property for which a requisition for supply of electrical energy is received shall be laid free of charge. The charges for the rest of the service line shall be recovered on the basis of the actual cost in accordance with condition No. 6 of the conditions of supply plus 14 per centum of the labour charges to cover supervision charges.

NOTE. – For the first month of service connection or re-connection the meter rent will be 50 per cent only if the period is 15 days or less, and full if more than 15 days. For the month in which meter is removed the rent will be calculated on similar basis.

NOTE.- (i) All charges except those under items 2(a) and 4 are payable in advance.

- (ii) The dispute between the consumer and the licensee regarding accuracy of meter or any other indicator may be referred by either party to the Electrical Inspector for settlement.

Extension for additions to service lines to meet increased maximum demand will be charged for on the same basis.

B. Miscellaneous Charges:-

Item no.	Name of charges	Amount of charges
1.	2.	3.

1. Reconnection fees –
 - (a) For installations upto 11 KW-
 - (i) at cut outs,
 - (ii) at overhead mains,
 - (iii) at underground mains.
 - (b) For installations over 10 KW, 25 per cent added to the charges under item A above.
 - (c) If the same consumer is reconnected within 12 months of the date of last reconnection, 50 per cent will be added to the charges under items (a) and (b) above.
2. Meters –
 - (a) Hire of meter, where it is the property of the licensee, per meter per-mensem –
 - (i) A.C. Single phase meter
 - (ii) A.C. Polyphase meter
 - (iii) Demand for special type meter.
 - (b) Removing of meter at consumer's request.
 - (c) Refixing of meter at consumer's request.
 - (d) Changing meter for one of higher capacity only at the request of the consumer.
3. Testing-
 - (a) Installations-
 - (i) The first test and inspection will be carried out free of charge but should any further test or inspection be necessitated by faults in the installation or by non-compliance with the conditions of supply per extra test or inspection.
 - (ii) Periodical testing at consumer's request, per test.
 - (b) Meters-
 - (i) A.C. Single phase meter
 - (ii) A.C. Polyphase meter
 - (iii) Demand or special type meter.
4. Replacements of –
 - (i) Licensees's fuse.
 - (ii) Consumer's fuse.

APPENDIX 'A'

**APPLICATION AND AGREEMENT FOR ELECTRICAL SUPPLY FOR
DOMESTIC/INDUSTRIAL PURPOSE**

Application No.

Connection No.

To

The Electrical Engineer/Secretary/Manager,Electric Supply Co. Ltd.,.....

I/We hereby agree to take fromElectric Supply Co. Ltd. at the premises stated below a supply of electrical energy not exceeding the connected load of my/our installation as stated below for a period of not less than two years from the date of commencement of supply and, I/We hereby further agree to pay for the said supply at the tariff rates and on the conditions

of supply in force, from time to time and also to pay for all such other proper charges as become due by me/us from time to time at rates as prescribed in Part III of the conditions of supply. I/We further agree that I/We lodge with you a deposit calculated as prescribed in the licensees' Conditions of Supply and I/We hereby declare that the said Conditions of Supply have been perused by/read to me/us and I/We agree to be bound by the provisions of Clause VI of the Schedule to the Indian Electricity Act, 1910 andElectric Licence, 19.....I/We hereby request you to supply the required energy within one month or such longer period as the Electrical Inspector for may allow from the date of the requisition.

I/We further require you to supply me/us with the necessary meter/meters on hire in terms of section 26 of the Indian Electricity Act, 1910. I/We agree to give you such security as may be required for the price of the meter/meters whenever called upon to do so.

The necessary requisition form duly filled in is attached herewith.

Signature of applicant

Dated:

Present address

Signature & address of witness.

Accepted on behalf ofElectric Supply Co. Ltd.

Signature.

Dated.

Electrical Engineer
Secretary/Manager

ANNEXURE VII

(See Rule 28)

FORM OF REQUISITION UNDER CLAUSE V(4) OF THE SCHEDULE TO THE ACT

^{*1}We, the undersigned being owners or occupiers of premises situated in or uponstreet, within the "area of supply" specified in theLicence, 19..... do

²The Government ofthe³of.....being charged with public lighting ofstreet, within the area of supply specified in thelicence, 19..... do hereby require you, in pursuance of Clause V of the Schedule to the Indian Electricity Act, 1910, to provide, within six months of the date of this requisition distributing main throughout the said street.⁴

Date at

Theday of.....19.....

*1 In the case of two or more owners or occupiers.

2. In the case of State Government or a local authority.

3. The local authority's name will have to be inserted.

4. Or such part of the street as may be specified.

ANNEXURE VIII

(See Rule 28)

FORM OF REQUISITION FOR SUPPLY OF ENERGY UNDER CLAUSE VI(5) OF THE SCHEDULE TO THE ACT

To

Sir,

(Name of Licensee)

I/We hereby require you, in accordance with Clause VI of the Schedule to the Indian Electricity Act, 1910 within one month or within such longer period as the Electrical Inspector may allow from the date of this requisition to supply energy for the premises owned/occupied by me/us, and situated within the area of supply specified in theLicence 19.....

I/We further require you to supply me/us with the necessary meter/meters on hire in terms of section 26 of the Indian Electricity Act, 1910. I/We agree to give you such security as may be required for the price of the meter/meters whenever called upon to do so.

2. Applicant's Name.

Occupation/Designation

Class/premises

House No. and/or

Name of the Premises

Street

Town

Village or Taluka

Locality

Owned/Tenanted by

3. The following are my/our requirements:

A. Domestic or Residential: No. of points

Wattage

Total Wattage

(a) Lights and Fans

(b) Heating and small power

B. Commercial

(a) Lights and Fans

(b) Heating and small power

C. Industrial Power

Motor and/or apparatus	No. of points	H.P. & K.W.	Total H.P. & K.W.	Purpose
------------------------	---------------	-------------	-------------------	---------

(a) Low voltage

(b) Medium voltage

(c) High voltage

D. Other purposes.

4. Total connected load applied for Watt/Kilowatt.

5. This requisition is for:

(1) A new service.

(2) A sub-service from one existing service.

The name and address of the consumer whose service is to be tapped:

His Service No. is

(3) An extension to my existing installation from Service No.

(4) A re-connection of Service No.

(5) A change of name from

(6) The system of wiring will be

1[(7) The wiring work has been/will be carried by:

Name of Contractor:

Address:

Licence No.:

Class:

Validity:]

Applicant's signature

Dated the day of 19

Present address:

Note: The applicant is requested to complete the clause referring to this requisition and to strike out the clauses which are inapplicable.

2. Under Clause VI(1) 1st proviso of the Schedule to the Indian Electricity Act, 1910, the licensee shall not be bound to comply with any such requisition unless and until the person making it-

(a) within fourteen days after the service on him by the licensee of a notice in writing in this behalf, tenders to the licensee a written contract in the form, approved by the State Government duly executed and with sufficient security binding himself to take the supply of energy for not less than two years to such amount as will assure to the licensee at the current rates charged by him, an annual revenue not exceeding 15 percentum of the cost of the service line required to comply with the requisition; and

(b) if required by the licensee so to do, pays to the licensee the cost of so much of any service line as may be laid down or placed for the purposes of the supply upon the property in respect of which the requisition is made, and of so much of any service line as it may be necessary for the said purposes to lay down or place beyond 30 metres from the licensee's distributing mains, although not on that property.

3. In lieu of the contract referred to in Note 2(a) above, the licensee is prepared to accept a declaration in the following form, subject to deposit of any required securities by the applicant:

DECLARATION

I/We hereby declare that I/We desire to have and agree with the licensee to take a supply of energy for the above mentioned purposes for a period of not less than two years from the date of commencement of the supply and to be bound by the provisions of Clause VI of the Schedule to the Indian Electricity Act, 1910 and by the licensee's charge appropriate tariffs applicable to me/us conditions of supply as are from time to time in force.

Applicant's signature

One rupee stamp

ANNEXURE IX

FORM OF ORDER UNDER SUB-RULE (4) OF RULE 5, SUB-RULE (2) OF RULE 46

To

Supplier, consumer
Owner or occupier

1. Whereas the installation was inspected on..... and whereas it appears to me that you have not complied with rule (5) of the Indian Electricity Rules, 1956, in the following

1. Subs. vide G.S.R. 466, dated 17.8.1991.

respect* namely you are hereby called upon to comply with the said rule(s) on or beforeday of 19..... and to report compliance in writing to me.

2. An appeal may be filed against this order under sub-rule (4) of rule 5 of the Indian Electricity Rules, within three months of the date on which this order is served or delivered or is deemed to have been delivered but this order must be complied with, notwithstanding such appeal, unless the appellate authority on or before the date specified in paragraph above, suspends its operation.

Signature

Dated at
The day of 19

Electrical Inspector,
Officer appointed under
sub-rule (4) of rule 5

- Particulars to be given where necessary.

ANNEXURE IXA
(See Rule 46)
MODEL FORMS OF INSPECTION REPORT
FORM I

INSPECTION REPORT

(Under Rule 46 of the Indian Electricity Rules, 1956) Low Voltage Installation of Consumer.)

Report No. _____ Date of Inspection _____

Challan No. _____

Dated _____ Inspection Fee Rs. _____

Date of Last inspection _____

1. Consumer No. _____
2. Voltage and system of supply:
 - (i) Volts _____
 - (ii) No. of Phases _____
 - (iii) AC/DC _____
3. Type of wiring *
4. Name of the consumer/owner _____
5. Address of the consumer/owner _____
6. Location of the premises _____
7. Particulars of the installations: _____
 - (I) Leakage on premises: Number _____ Connected Load in KW _____
 - (1) Light Points _____
 - (2) Fan Points _____
 - (3) Plug Points _____

* Here state casing capping, lead covered of teak wood batten, concealed, conduit, Tough, Rubber Sheathed and such other types.

(II) Other equipments (complete details to be furnished):

(1) _____

(2) _____

Total connected load in KW _____

Maximum current demand in Amps _____
(on the basis of total connected load)

(III) Generators (in the case of consumer himself generating energy):

(1) _____

(2) _____

8. General condition of the installation:

Rule of the Indian Electricity Rules, 1956	Requirements	Report
1.	2.	3.

29

(i) Is/Are there any sign(s) of overloading in respect of any apparatus wiring ?

(ii) Condition of flexible cords, sockets, switches, plug-pins, cut-outs and lamp holders and such other fittings.

(iii) General condition of wiring.

(iv) State if any unauthorised temporary installation exists.

(v) State if sockets are controlled by individual switches.

(vi) Any other defect or condition which may be a source of danger.

30 Give report on condition of service lines, cables, wires, apparatus and such other fittings placed by the supplier/ owner of the premises.

31 Has the supplier provided suitable cut-outs within consumer's premises, within enclosed fire proof receptacle ?

32

(i) State if switches are provided on live conductors.

(ii) State if indication of a permanent nature is provided as per this rule so as to distinguish neutral conductor from the live conductor.

(iii) Whether a direct line is provided on the neutral in the case of single phase double pole iron clad switches instead of fuse ?

33

(i) State if earthed terminal is provided by the supplier.

(ii) Have three pin plugs been provided for plug points ?

(iii) Report on the efficiency of the earthing arrangement.

49 Leakage on premises:

State insulation resistance between conductors and earth in megaohms.

50

(i) State if linked switches of requisite capacity are provided near the point of commencement of supply.

(ii) State if the wiring is divided in suitable number of circuits and each such circuit is protected by suitable cut-out.

1.	2.	3.
----	----	----

- (iii) State if supply to each motor or apparatus is controlled by suitable linked switch.
- (iv) Has it been ensured that no live part is so accessible as to cause danger ?

61

- (i) Have the frame of every generator, stationary motor and so far as practicable portable motor and the metallic parts (not intended as conductors) of all other apparatus used for regulating ** or controlling energy been earthed by two separate and distinct connections with earth ?
- (ii) Is the earth wire free from any mechanical damage ?
- (iii) In the case of conduit/lead covered wiring, has the conduit or lead-cover been efficiently earthed ?
- (iv) If the consumer has his own earth-electrode, state if it is properly executed and has been tested with satisfactory results.

Overhead lines:

74 to 93

- (i) State if the consumer has any overhead line and if so their condition with specific reference to relevant rule.
- (ii) Is there any other overhead line near the premises of the consumer which does not comply with rule 79 or 80 ?
- (iii) Is guarding provided for overhead lines, if it is inside the factory for road crossings and busy localities ?
- (iv) Any other remarks.

Inspecting Officer's Signature

Name _____

Designation _____

File No. _____

Dated: _____

Copy forwarded to the Electrical Inspector for in accordance with rule 46(1)(b) of the Indian Electricity Rules, 1956.

Signature _____

Name _____

** Not applicable to isolated wall tubes or to brackets, electroliers, switches, ceiling fans and such other fittings (other than portable hand lamps and transportable apparatus) unless provided with earth terminal.

FORM II**INSPECTION REPORT**

(Under rule 46 of the Indian Electricity Rules, 1956)
(Medium voltage installations of a consumer)

Report No. _____ Date of Inspection _____

Challan No. _____ Dated _____

Inspection Fee Rs. _____ Date of last Inspection _____

1. Consumer No. _____
2. Voltage and system of supply:
 - (i) Volts _____ (ii) No. of Phases _____ (iii) AC/DC _____
3. Name of the consumer/owner _____
4. Address of the consumer/owner _____
5. Location of the premises _____
6. Particulars of the installations: _____

I. Motors:

	Make	No.	H.P.	Amps.	Voltage
(1)	_____	_____	_____	_____	_____
(2)	_____	_____	_____	_____	_____
(3)	_____	_____	_____	_____	_____
(4)	_____	_____	_____	_____	_____
(5)	_____	_____	_____	_____	_____

II. Other equipment (complete details to be furnished):

- (1) _____
 - (2) _____
 - (3) _____
- Total connected load h.p./KVA _____

III. Generator (in the case of consumer himself generating energy):

- (1) _____
- (2) _____
- (3) _____

7. General condition of the installation:

Rule of the Indian Electricity Rules, 1956	Requirements	Report
1.	2.	3.

- 3 Is the list of authorised persons properly made and kept up to date duly attested ?

29

- (i) Is/Are there any sign(s) of overloading?
- (ii) State if any unauthorised temporary installation exists.
- (iii) Are the electric supply lines and apparatus so installed, protected, worked and maintained as to prevent danger ?
- (iv) Any other general remarks.

- 30 Service line and apparatus of the supplier on consumer's premises.
Give report on condition of service lines, cables, wires, apparatus and such other fittings placed by the supplier/owner of the premises.
- 31 Has the supplier provided suitable cut-outs within consumer's premises, in an accessible position ? Are they contained within an adequately enclosed fire proof receptacle ?
- 32
- (i) State if switches are provided on live conductors.
 - (ii) State if indication of a permanent nature is provided as per this rule so as to distinguish neutral conductor from live conductor.
 - (iii) Whether a direct link is provided on the neutral in the case of single phase double pole iron clad switches instead of fuse ?
- 33
- (i) State if earthed terminal is provided by the supplier.
 - (ii) Is the Consumer's separate earth efficient ?
 - (iii) Report on the efficiency of the earthing arrangement.
- 34
- (i) Are bare conductors in building inaccessible ?
 - (ii) Whether readily accessible switches have been provided for rendering them dead ?
 - (iii) Whether any other safety measures are considered necessary ?
- 35 State if "Danger Notice" in Hindi and the local language of the district and the type approved by the Electrical Inspector is affixed permanently in conspicuous position as per this rule.
- 38 State if flexible cables used for portable or transportable equipment covered under this rule, are heavily insulated and adequately protected from mechanical injury.
- 44
- (i) State if instructions in ¹[English or Hindi and the local language of the district and where Hindi is the local language, in English and Hindi,] for the restoration of persons suffering from electric shock have been affixed in a "conspicuous place".
 - (ii) Are the authorised persons able to apply instructions for resuscitation of persons suffering from electric shock ?
- 49 Leakage on premises:
State insulation resistance between conductors and earth in Megaohms.
- 50
- (i) Whether a suitable linked switch/circuit breaker is placed near the point of commencement of supply so as to be readily accessible and capable of being easily operated to completely isolate the supply ?
 - (ii) Whether every distinct circuit is protected against excess energy by means of a suitable circuit breaker or cut-out ?
 - (iii) State if a suitable linked switch or circuit breaker is provided near each motor or apparatus for controlling supply to the motor or apparatus.
 - (iv) State if adequate precautions are taken to ensure that no live parts are so exposed as to cause danger.

1. Ins. vide G.S.R. 735, dated 4th September, 1982.

1.	2.	3.
----	----	----

51

- (i) State the condition of metallic coverings provided for various conductors.
- (ii) (a) State whether clear space of 90 cm is provided in front of the main switch board.
- (b) State whether the space behind the switch board exceeds 75 cm in width or is less than 23 cm.
- (c) In case the clear space behind the switch-board exceeds 75 cm. state whether a passage way from either end of the switchboard to a height of 1.80 metres is provided.

61

- 61 (i) Has the neutral conductor at the transformer been earthed by two separate and distinct connections with earth.
- (ii) Have the frame of every generator, stationary motor and so far as practicable portable motor and the metallic parts (not intended as conductors) of all transformers and any other apparatus used for regulating or controlling energy and all medium voltage energy consuming apparatus been earthed by two separate and distinct connections with earth ?
- (iii) Have the metal casings or metallic coverings containing or protecting any electric supply line or apparatus been properly earthed and so joined and connected across all junction boxes as to make good mechanical and electrical connection ?
- (iv) State if the consumer's earth-electrode is properly executed and has been tested with satisfactory results.
- (v) Is the earth wire free from any mechanical damage ?

Overhead lines:

74 to 93

- (v) State if the consumer has any overhead lines and if so their condition with specific reference to relevant rules.
- (vi) Is there any other overhead line near the premises of the consumer which does not comply with rule 79 or 80 ?
- (vii) Is guarding provided for overhead lines, if it is inside the factory, for road crossings and busy localities ?
- (viii) Any other remarks.

Inspecting Officer's Signature

Name _____
 Designation _____
 File No. _____

Dated: _____

FORM III**INSPECTION REPORT**

(Under Rule 46 of the Indian Electricity Rules, 1956)

High and Extra-high Voltage Installation of a Consumer

Report No. _____ Date of Inspection _____

Challan No. _____ Dated _____ Inspection Fee Rs. _____

Date of Last inspection _____

1. Consumer No. _____

2. Voltage and system of supply:

(i) Volts _____

(ii) No. of Phases _____

(iii) AC/DC _____

3. Name of the consumer/owner _____

4. Address of the consumer/owner _____

5. Location of the premises _____

6. Particulars of the installations: _____

I. Motors:

	Make	No.	H.P.	Amps.	Voltage
--	------	-----	------	-------	---------

(1) _____

(2) _____

(3) _____

II. Transformers:

	Make	No.	KVA	Power Factor	Voltage	

					H.V.	L.V.

(1) _____

(2) _____

(3) _____

III. Other equipment (complete details to be furnished):

(1) _____

(2) _____

(3) _____

IV. Total capacity in h.p./KVA _____

V. Generators (in the case of consumer himself generating energy):

(1) _____

(2) _____

7. General condition of the installation:

Rule of the Indian Electricity Rules, 1956	Requirements	Report
1.	2.	3.

- 3(i) Is the list of authorised persons properly made and kept up to date duly attested ?
- (ii) Whether the authorised persons are competent for the work assigned to them ?
- 29(i) Is/are there any sign(s) of overloading in respect of any apparatus ?
- (ii) State if any unauthorised temporary installation exists.
- (iii) Whether the H.V. motors and controlling equipment are being over hauled periodically and record kept of the same in a register ?
- (iv) Whether the tranformer oil samples are being tested periodically and results recorded in a register ?
- (v) Whether suitable lightning arrestors have been provided near the transformers for protection against lightning ?
- (vi) Whether earth resistance is being measured periodically and results recorded in a register ?
- (vii) Any other defect or condition which may be source of danger.
- (viii) Any other general remarks.
- 30 Service line and apparatus of the supplier on consumer's premises:
Give report on condition of service lines, cables, wires, circuit breaker, Isolating switches, protective recording and integrating apparatus and such other fittings placed by the supplier/owner on the premises.
- 31 Has the supplier provided suitable cut-outs, within consumer's premises, in an accessible position ? Are they within an adequately enclosed fire proof receptacle ?
- 33(i) State if earthed terminal is provided by the supplier.
- (ii) Is the Consumer's separate earth efficient ?
(State the earth resistance, if measured)
- (iii) Report on the efficiency of the earthig arrangement.
- 34(i) Are bare conductors (if any) in building inaccessible ?
- (ii) Whether readily accessible switches have been provided for rendering them dead ?
- (iii) Whether any other safety measures are considered necessary ?
- 35 State if "Danger Notices" in Hindi and the local language of the district and of the type approved by the Electrical Inspector is affixed permanently in conspicuous position as per this rule.
- 36 Whether the practice of working on livelines and apparatus is adopted ? If so, have the safety measure been approved by the Electrical Inspector ?
- 41 State if the circuits or apparatus intended for operating at different voltage(s) are distinguishable by means of indication(s) of permanent nature.

1.	2.	3.
42	Whether all circuits and apparatus are so arranged that there is no danger of any part(s) becoming accidentally charged to any voltage beyond the limits of voltage for which it/they is/are intended ?	
43(i)	In the case of generating and enclosed stations have fire-buckets, filled with clean dry sand, been conspicuously marked and kept in convenient situations in addition to fire-extinguishers suitable for dealing with electric fires ?	
(ii)	State if First Aid Boxes or cupboards conspicuously marked and properly equipped are provided and maintained.	
(iii)	Is some staff trained in First Aid Treatment ?	
44(i)	State if instructions in ¹ [English or Hindi and the local language of the district and where Hindi is the local language, in English and Hindi,] for the restoration of persons suffering from electric shock have been affixed in a “conspicuous place”.	
(ii)	Are the authorised persons able to apply instructions for resuscitation of persons suffering from electric shock ?	
49	Leakage on premises: State insulation resistance between conductors and earth in Megaohms.	
50(i)	Whether a suitable linked switch/circuit breaker is placed near the point of commencement of supply so as to be readily accessible and capable of being easily operated to completely isolate the supply ?	
(ii)	Is there a suitable linked switch or a circuit breaker to carry and break the full load current on the secondary side of a transformer ?	
(iii)	Whether every distinct circuit is protected against excess energy by means of a suitable circuit breaker or cut-out ?	
(iv)	State if a suitable linked switch or circuit breaker is provided near the High voltage motor or other apparatus for controlling supply to the motor or apparatus.	
(v)	State if adequate precautions are taken to ensure that no live parts are so exposed as to cause danger.	
51(i)	State the condition of metallic coverings provided for various conductors.	
(ii)(a)	State whether clear space of 90 cm is provided in front of the main switch board.	
(b)	State whether the space behind the switch board exceeds 75 cm in width or is less than 23 cm.	
(c)	In case the clear space behind the switch-board exceeds 75 cm. state whether a passage way from either end of the switchboard to a height of 1.80 metres is provided.	
64(i)	State if all conductors and apparatus including live parts thereof are inaccessible.	
(ii)	State if all windings of motors or other apparatus are suitably protected.	
(iii)	State the method adopted to guard lower voltage circuits in transformer(s) becoming accidentally charged above its/their normal voltage.	

1. Ins. vide G.S.R. 735, dated 4th September, 1982.

1.	2.	3.
	(iv) State in case of transformers or switches or static condensers involving the use of more than 2,275 litres of oil in one chamber, if suitable oil soak pits are provided.	
	(v) Where 9,000 litres or more of oil is used in any one oil tank, has provision been made for draining away or removal of oil which may leak or escape from such tank(s) ?	
	(vi) State if trenches inside sub-station containing cables are filled with non-inflammable material or completely covered with non-inflammable slabs.	
	(vii) Are conductors and apparatus so arranged that they may be made dead in sections for carrying out work thereon ?	
66	In case of metal sheathed electric supply lines, are the metal sheaths connected with earth properly ?	
67(i)	Have the frame of every generator, stationary motor, and so far as practicable portable motor and metallic parts not intended as conductors of all transformers and any other apparatus used for regulating or controlling energy and all high voltage energy consuming apparatus been earthed by two separate and distinct connections with earth ?	
	(ii) Is the earth wire free from any mechanical damage ?	
	(iii) Have two separate and distinct connections with earth, each having its own electrode, been provided for the earth neutral point ?	
	(iv) Have the metal casings or metallic coverings containing or protecting any electric supply line or apparatus been properly earthed and so joined and connected across all junction boxes as to make good mechanical and electrical connections throughout their whole length ?	
68	Is the outdoor (except pole type) sub-station efficiently protected by fencing not less than [1.8] ¹ metres in height ?	
69(i)	Where platform type construction is used for pole type sub-station, has sufficient space for a man to stand on the platform been provided ?	
	(ii) Has hand-rail been provided and connected with earth (if metallic and if sub-station has not been erected on wooden supports) ?	
70	Has suitable provision been made for immediate and automatic discharge of every static condenser on disconnection of supply ?	
	Overhead lines:	
74	What is the minimum size of the conductors of overhead lines used ? State the type of conductors.	
77	Are clearances above ground of the lowest conductor of overhead Lines, including services lines, as per this rule ?	
80(i)	On the basis of maximum sag, are verticle clearances where the high or extra-high voltage line passes above or adjacent to any building or part of a building as per this rule ?	
	(ii) On the basis of maximum deflection due to wind pressure, are horizontal clearances between the nearest conductor and any part of such building as per this rule ?	

1. Value '2.45' subs.vide G.S.R. 735, dated 4th September, 1982.

1.	2.	3.
81	Where conductors forming parts of system at different voltages are erected on the same supports, has adequate provision been made to guard against danger to linemen and others from the lower voltage system being charged above its normal working voltage by leakage from or contact with the higher voltage system ?	
87	Where overhead lines cross or are in proximity to each other have they been suitably protected to guard against possibility of their coming in contact with each other.	
88(i)	Has every guard wire, been properly earthed at each point at which its electrical continuity is broken ?	
(ii)	What is the type and size of guard wire ?	
90(i)	Are the metal supports of overhead lines and metallic fittings attached thereto permanently and efficiently earthed ?	
(ii)	Has each stay-wire (except in case where an insulator has been placed in it at a height not less than 3 metres from the ground) been similarly earthed ?	
91(i)	Has the overhead line been suitably protected with a device for rendering the line electrically harmless in case it breaks ? What type of device is used ?	
(ii)	Whether anticlimbing devices have been provided for each of the high voltage and extra high voltage supports ?	
92(i)	Has the owner of overhead lines adopted efficient means for diverting to earth any electrical surges due to lightning in every overhead line which is so exposed as to be liable to injury from lightning ? What type of means are used ?	
(ii)	Has earthing lead from the lightning arrestors been connected to a separate earth electrode ?	
93(i)	Are unused overhead lines being maintained in a safe mechanical condition ?	
(ii)	Any other remarks.	

Inspecting Officer's Signature

Name _____

Designation _____

File No. _____

Dated: _____

ANNEXURE X
FORM OF ANNUAL RETURN FOR MINES

(See Rule 111)

This form must be correctly filled up by the owner, agent, ¹[manager or engineer] and sent to the Inspector not later than the first day of February every year.

Part A

Year ending 19

Name of Mine
Situation of Mine

State
District

1. Amended vide G.S.R. 137, dated 12th February, 1983.

Postal address of Mine
 Name and address of owner
 Name of Agent
 Name of Manager
¹[Name of Engineer]
²[Name of Electrical Supervisor]

Part B

1. System of supply (whether direct current or alternating current)
 Voltage of supply
 Periodicity (if alternating current)
 Source of supply.
2. Voltage at which electricity is used for :-
 Lighting
 Power
3. Particulars of Motor etc.

POWER (a) On Surface

Type H.P./K.W. of Motor/ apparatus and voltage	Type of control Gear	Location	Purpose for which used
---	----------------------	----------	---------------------------

(b) In Mine

Type H.P./K.W. of Motor/ apparatus and voltage	Type of control Gear	Location	Purpose for which used	Ventilation Percentage of inflammable gas or vapour
---	----------------------------	----------	---------------------------	--

LIGHTING

Type light fitting	Wattage	Location	Percentage of inflammable gas or vapour
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1. Added vide G.S.R.137, dated 12th February, 1983
2. Ins. vide G.S.R. 466, dated 17.8.1991.

ANNEXURE XI
FORM OF ANNUAL RETURN FOR OIL-FIELDS

(See Rule 111)

This form must be correctly filled up by the owner, agent, ¹[manager or *installation manager] and sent to the Inspector not later than the first day of February every year.

²[Part A]

Year ending 19

Situation of Oil-field

Name of Oil-field

State

District

Postal address of Oil-field

Name and address of owner

Name of Agent

Name of Manager

Name of ³[Installation Manager]

⁴[Name of Electrical Supervisor]

Part B

1. System of supply (whether direct current or alternating current)

Voltage of supply

Periodicity (if alternating current)

Source of supply.

2. Voltage at which electricity is used for :-

Lighting

Power

3. Particulars of Motor etc. in use on the field :-

(a) On wells

No. or other identifying Mark of well	Drilling or pumping	Type and H.P. of motor	No. of lamps & type	Other electrical appliances

(b) Not on wells

Type and H.P. of Motors	Purpose for which used	Identifying mark on map

4. Other electrical appliances, not included in item 3, in use on the field.

Appliances	Type and size in K.W.	Purpose for which used	Identifying mark on map

1. Amended vide G.S.R. No. 137, dated 12th February, 1983

2. Subs. vide G.S.R. No. 137, dated 12th February, 1983

3 & * Subs. vide G.S.R. No. 468, dated 25th November, 2000

4. Ins. vide G.S.R. No. 466, dated 17-8-1991

ANNEXURE XII
LOG SHEET FOR MINES AND OIL-FIELDS
 [See sub-rule (5) of Rule 131]

Daily Log sheet for

1. ¹[Name of Electrical Supervisor]
2. Report as to:-
 - (a) Condition of the insulation of the system.
 - (b) Specified defects of insulation (particulars of each failure of apparatus should be given).
 - (c) Accidents or dangerous occurrence (including any cases of electric shock and any cases of open sparking in apparatus in use in places where rule 126 applies).
 - ²[(d) Disconnection and reconnection of supply as required by rule 126 5(i) and (ii)]
 - (e) Examination of earth fault detectors or recorders as provided by rule 116(3).
 - (f) Examinations of apparatus as provided by rule 131:-
 - (i) Routine examinations as required by clause (a) of sub-rule (3) of rule 131.
 - (ii) [Special examination]* as required by clause (b) of sub-rule (3) of rule 131.
3. Remarks:-

Signed

Examined by

²[Electrical Supervisor:
 Engineer:
 Manager.]

* State which apparatus has been examined or tested and result.

NOTE:- This log sheet should be filled in as completely as possible. If, for instance, there are no defects of insulation to report, the word 'non' should be written in the vacant space.

³[ANNEXURE XIII]
FORM FOR REPORTING ELECTRICAL ACCIDENTS
 [See Rule 44-A]

1. Date and time of accident.
2. Place of accident
 (Village/Town, Tehsil/Thana, District and State)
3. System and voltage of supply, (Whether EHV/HV/LV Line, sub-station/generating station/consumer's installations/service lines/other installations).
4. Designation of the Officer-in-charge of the supplier in whose jurisdiction the accident occurred.
5. Name of owner/user of energy in whose premises the accident occurred.
6. Details of victim (s):-

1. Subs. vide G.S.R. 45 dated 23.1.1993
 2. Subs. vide G.S.R. 466, dated 17.8.1991
 3. Subs. vide G.S.R. 425, dated 27th April, 1985.

(a) Human:

Sl. No.	Name	Father's Name	Sex of victim	Full postal address
1	2	3	4	5
Approximate age		Fatal/non-fatal		
6		7		

(b) Animal:

Sl. No.	Description of animal(s)	Number(s)	Name(s) of owner(s)
1	2	3	4
Address(es) of owner(s)		Fatal/non-fatal	
5		6	

7. In case the victim(s) is/are employee(s) of supplier:-

(a) designation of such person(s).

(b) brief description of the job undertaken, if any.

(c) Whether such person/persons was/were allowed to work on the job.

8. In case the victim(s) is/are employee(s) of a licensed contractor:-

(a) did the victim(s) possess any electric workman's permit(s), supervisor's certificate of competency issued under rule 45 ? If yes, give number and date of issue and the name of issuing authority.

(b) name and designation of the person who assigned the duties of the victim(s).

9. In case of accident in the supplier's system, was the permit to work (PTW) taken ?

10.

10(a) Describe fully the nature and extent of injuries, e.g. fatal/disablement (permanent or temporary) of any portion of the body or burns or other injuries.

(b) In case of fatal accident, was the post mortem performed ?

11. Detailed causes leading to the accident.

(To be given in a separate sheet annexed to this form).

12. Action taken regarding first-aid, medical attendance etc. immediately after the occurrence of the accident (give details).
13. Whether the District Magistrate and Police Station concerned have been notified of the accident (if so, give details).
14. Steps taken to preserve the evidence in connection with the accident to extent possible.
15. Name and designation(s) of the person(s) assisting, supervising the person(s) killed or injured.
16. What safety equipments were given to and used by the person(s) who met with this accident (e.g. rubber gloves, rubber mats, safety belts and ladders etc.) ?
17. Whether isolating switches and other sectionalising devices were employed to deaden the sections for working on the same ? Whether working section was earthed at the site of work?
18. Whether the work on the live lines was undertaken by authorised person(s) ? If so, the name and the designation of such person(s) may be given.
19. Whether artificial resuscitation treatment was given to the person(s) who met with the electric accident ? If yes, how long was it continued before its abandonment ?
20. Names and designations of persons present at and witnessed the accident.
21. Any other information remarks.

Place:

Time:

Date:

Signature

Name

Designation

Address of the person reporting

¹[ANNEXURE XIV]

(See Rule 3(2A))

GUIDELINES FOR PROVIDING TRAINING AS REQUIRED UNDER RULE 3(2A)

1. The owner of every generating station of capacity of 100MW and above shall arrange for training of personnel engaged in the operation and maintenance of his generating station, in the manner specified below:-
 - (1) (a) The training may be arranged in his own institute or any other institute established for this purpose.
(b) Any institute where such training is arranged shall have been recognised by the Central Electricity Authority.
 - (2) There shall be separate training courses for the persons to be engaged in operation and maintenance of thermal power stations and hydro power stations together with associated sub-stations. In respect of thermal stations, separate course may be arranged for the operating and supervisory staff and other skilled persons who are to assist them.
 - (3) Refresher courses shall be arranged periodically for the persons who have already undergone training under para (2) above and those who have already sufficient experience in the operation and maintenance of a generating station and are engaged in its operation and maintenance under clause (b) of sub-rule 2(A) of rule 3 to familiarise with modern practices of operation and maintenance.
2. Duration and content of training shall be as specified below:-
 - (1) **Thermal Power Stations.**- The duration of the training courses for the operating supervisory staff (both electrical and mechanical) shall not be less than 12 months. This shall include 186 hours of lectures as specified in Appendix I to this Annexure followed by specialised lectures as specified in Appendix II to this Annexure for the mechanical and electrical fields. The lectures may be arranged during the half day and the other half day shall be spent on observation by the trainees in the power stations to get familiarised with different sections of the power station. After the lecture course is completed the trainees should be taken on visits to a few modern power stations and factories manufacturing turbines, generators, switchgear, instrumentation and auxiliary equipments. The remaining period will be spent on in-plant training where the candidates will be given an opportunity to operate or maintain the machinery by themselves under close supervision of the regular operating staff as well as the training supervisors. Arrangements shall be made for familiarising the trainees with the operation of power stations, through simulator facilities.
 - (2) The duration of the training course for the skilled person to assist the operators and supervisory staff in a thermal power stations shall not be less than nine months. This shall include 82 hours of lectures as specified in Appendix III to this Annexure followed by specialised lectures as specified in Appendix IV. The lectures may be arranged during the half day and the other half day being spent on observation by the trainees in the power stations so that they get familiarised with different sections of the power station. After the later course is completed; the trainee shall be taken on visits to study a few modern power stations and factories manufacturing turbines, generators, switch gear, instrumentation and auxiliary equipments. The remaining period will be spent on in-plant training under close supervision.
 - (3) The duration of the training course for the operation and supervisory staff to work in hydro power stations shall not be less than nine months. This shall include 124 hours of lectures as specified in Appendix V to this Annexure. The procedure for familiarisation visits and in-plant training shall be similar to that which has been specified in respect of thermal power stations.
 - (4) Those who are expected to be engaged in the operation and maintenance of the sub-station associated with the generating station shall be given a training of duration of not less than six months as specified in Appendix VI to this Annexure. This shall be followed by visits and in-plant training.

1. Ins. vide G.S.R. 461, dated 9th May, 1981.

- (5) The duration and contents of the refresher course shall be determined jointly by the owner of the generating station and the training institute.

2. Qualifications:

The minimum qualification for the operating and supervisory staff shall preferably be a high second class diploma in mechanical or electrical engineering or a degree from a recognised institute or university. The minimum qualifications for the persons to assist the operating and supervisory staff shall be certificate from a recognised Industrial Training Institute in appropriate trade.

3. Creation of the Institute:

- (1) Every training institute shall be established adjacent to a power station so as to facilitate familiarisation and provide in-plant training.
- (2) The training institute shall preferably be of residential type and shall have a full time Principal and adequate number of teaching staff. The training institute shall have facilities for demonstrations by models, simulators and for exhibition of slides and movies.
- (3) The institute shall have a systematised scheme of evaluation and assessment of the performance of the candidates by conducting oral and written tests at adequate intervals. The assessment forms shall be as specified in Appendix VII to this Annexure.
- (4) The number of trainees in any one batch shall not normally exceed 25 so as to maintain a good teacher-trainees relationship.
- (5) The institute shall have facilities to arrange refresher courses for those personnel who have already experience in the operation and maintenance of a generating station. The staff of the training institute shall be properly qualified and preferably undergone a specialised training course in the art of imparting training.

¹[Annexure XV
{See rule 65(8)}]

Form for failure report in respect of Transformers/Reactors of 20 MVA and above

1. Type of Equipment (Transformer/Reactor)
2. Capacity (MVA)
3. Location (Address)
4. Owner and address of owner
5. Date of failure
6. Year of manufacture
7. Date of Installation
8. Make
9. Reasons for failure
10. Measures being taken to avoid recurrence of failure

Date: _____

(Signature and name of
Installation Manager/Executive
Engineer of the installation)]

1. Ins. vide G.S.R.468, dated 25th November, 2000

APPENDIX I
**SYLLABUS FOR THE OPERATING AND SUPERVISORY STAFF ENGAGED IN THE
 OPERATION AND MAINTENANCE OF THE THERMAL POWER STATIONS**
 (General course for Electrical and Mechanical)

Item No.	Particulars	Number of Hours
1.	2.	3.
I	Concept of modern Thermal Station: Central Station and utility systems, base load and peaking stations, concept of unit system, typical thermal cycles, parameters, heat rates, fuel rates, steam rates, typical heat balance of boiler, turbine and generator	4
II	Choice of location of large thermal station: site availability, water requirements, fuel, load centres, transport facilities, air pollution, topography, choice of size of generating units.	3
III	Plant lay out in large central station including machine arrangements, equipment layout and auxiliary arrangements.	3
IV	Constructional details of large pulverised fuel boilers and auxiliaries (i) Water and steam drums, heaters and tubes. (ii) Types of furnace and firing arrangements, burner details. (iii) Economisers, primary, secondary, superheaters, re-heaters and attemperators.	16

1.	2.	3.
	<ul style="list-style-type: none"> (iv) Forced draught, Induced draught, Primary Air exhaustor and gas recirculation fans, compressors. (v) Types of coal mills (balls/recess, balltube, bowl roller) stokor, coal feeders. (vi) Air preheaters, Lunstorm, tubes, steam. (vii) Dust extraction plant – electrostatic, mechanical. (viii) Soot blowers: steam/compressed air operated. (ix) Station compressed air system – reciprocating and rotary compressors. (x) Oil handling and firing equipment. (xi) Boiler mountings, gauge glasses, safety valves, stop valves, start-up devices, stamping, chemical dosing, continuous blow down. (xii) Refractories and laggings as used in modern power stations. 	
V	Turbine and auxiliaries, constructional details	9
	<ul style="list-style-type: none"> (i) Principle of operation, heat conversion cycles, types of turbines. (ii) Casing, steam chests, wheel blading, nozzles, diaphragms, glands, flanges and bolt heating, bearings. (iii) Condenser and vacuum extraction plant, ejectors. (iv) Lubrication system, pumps, coolers, filters, shaft turbines and lifting gear. (v) Feed water Booster and extraction and cooling water pump. (vi) Low pressure and high pressure feed water heaters, deaerators and evaporators. (vii) High and low power by pass systems. (viii) Oil purifications unit. 	
VI	Alternators and excitation systems	6
	<ul style="list-style-type: none"> (i) Constructional details of alternators, methods of cooling (Hydrogen/air cooling). (ii) Main and pilot exciters, voltage regulators, types and characteristics, amplidyne and magnetic amplifier. (iii) Methods of grounding. 	
VII	Coal handling plant: Tipplers, hoppers, vibratory feeders and conveyors, crushers, magnetic separators and pulleys.	6
VIII	Ash and slag handling plant: Electrostatic precipitators, Methods of conveying pneumatic, vacuumatic, hydraulic; bucket elevators, conveyors, screw extractors	2
IX	Water sources, treatment: Raw water pumping station, domestic, circulating and boiler make up water treatment, River salinity, local water conditions, their variations in different seasons and effects on power station operation.	7
X	<ul style="list-style-type: none"> (i) Fuels: Solid, liquid and gaseous fuels – analysis. (ii) Coal-types and suitability for different kinds of boilers-alterations in firing methods due to change of coal composition. 	6

1.	2.	3.
XI	Basic flow diagrams in power station practice	8
	(i) Coal and fuel oil cycle	
	(ii) Air and gas cycle	
	(iii) Fly ash and slag handling arrangements	
	(iv) Condensate and feed heating cycle (from condenser hotwell upto economiser)	
	(v) Steam and water cycle (from economiser to turbine inlet)	
	(vi) Circulating water cycle.	
	(vii) Hydrogen filling in generator and hydrogen gland sealing of generator.	
	(viii) Bearing cooling system.	
XII	Direct and closed cooling circuits, cooling towers, types and characteristics.	2
XIII	D.C. & A.C. power supply for auxiliaries arrangements of units and station boards, station lighting and automatic changeover.	4
XIV	Transformers: main transformers, interconnecting transformer, station/unit transformers, voltage grounding transformers, types of connections, paralleling, tapchanger gear.	5
XV	Out-door switchyard single line diagrams, busbars, circuit breakers, isolators, current transformers, potential transformers, lightning arrestors, grounding.	5
XVI	Indoor and outdoor switchgear : types: bulk oil, minimum oil, air blast, air break – constructional details	3
XVII	Instrumentation and measurements: constructional details of measuring instruments for pressure, flow, temperature, level, draught, vibration eccentricity, conductivity, PH value, differential expansion, oxygen analyser, current, power, reactive power, frequency, energy, winding temperature. Auto-controllers, hydrogen purity meter. Axial shift indicator and recorder, fuel gas analysers, Megger – its use for primary detection of faults.	16
XVIII	Operation, control and supervision	15
	(i) General boiler start-up procedure	
	(ii) Operation of boilers under different loading conditions, soot blowing.	
	(iii) Banking and preservation of boilers.	
	(iv) Demonstration wherever possible through simulators of various operating conditions.	
	(v) Handling of boiler under emergency conditions, such as tripping of turbo-alternator set, high/low drum levels, flame failure, failure of supply to auxiliaries.	
	(vi) General start-up procedure for high pressure multicylinder reheat type turbines from cold, warm and hot conditions.	
	(vii) Handling of turbine, generator and auxiliary plant under emergency conditions, such as vacuum failure, low feed water, condenser levels, excitation failure, circulating water failure, feed water heater high levels, excessive vibration, water or oil ingress in generator, failure of lubricating, sealing oil circuits.	
	(viii) Alternator – synchronising, loading, parallel operations, MW & MVAR sharing.	
XIX	Controls and Protection – sequential operation and interlocks:	

1.	2.	3.
	(i) Boiler and auxiliaries	2
	(ii) Turbines and auxiliaries.	2
	(iii) Combustion control – pressure, fuel, air and feed heating cycle.	2
	(iv) Analysis of feed and Boiler water, fuel gas at station laboratory.	4
	(v) Feed water and feed heating cycle controls.	2
	(vi) Turbine governing, speed setting, speed drop setting and control circuits.	3
	(vii) Generator protection, under-voltage, over-voltage, differential, reverse power, under excitation, negative phase sequence, earth fault with types of the relays used.	4
	(viii) Importance of sequential inter-locks	2
	(ix) Transformer protection – differential, overload earth faults, high temperature, buchholz with types of the relays used.	4
	(x) Types of motors and variable speed-drive and speed controls	4
	(xi) Various types of pumps and their starting and control	3
	(xii) Steam temperature control	
	(xiii) Furnace purging	
XX	Fire fighting and multisifier type protection	3
XXI	General safety precautions, treatment of electrical or acid alkali burn, permit to work, first aid.	2
XXII	Indian Boiler Rules, Factory Act, Indian Electricity Act, 1910, Electricity (Supply) Act, 1948, Indian Electricity Rules, 1956 and other statutory regulation concerning Power Stations (General outline)	4
XXIII	General plant maintenance procedure, PERT/CPM Methods, Power Station records and calculation of efficiency	10
XXIV	Various type of valves, traps, their constructional details and application	2
XXV	Cranes, hoists, characteristics and control	3
XXVI	Personnel management, duties and responsibilities, Labour Laws and Labour Welfare	6
XXVII	Broad principles of material management and inventory control	4
		186

APPENDIX II

1. SPECIALISED MECHANICAL COURSE FOR OPERATING & SUPERVISORY STAFF WHO WILL BE ENGAGED ON THE MECHANICAL SIDE OF THE POWER PLANT.

Item No.	Particulars	Number of Hours
1.	2.	3.
I	Corrosion of boiler and auxiliaries, condenser and feed water heating plant: Scale formation in boiler in relation to water conditions.	7
II	Acid cleaning and preservation of boilers. Mechanical removal of scale and deposits from boilers where acid cleaning is not advisable. High pressure water jet equipment.	14

1.	2.	3.
III	Annual boiler and auxiliaries overhaul hydraulic test, floating of safety valves, preventive and breakdown maintenance of boiler auxiliaries	10
IV	Efficient operation of boilers-interpretation of gas analysis for proper combustion controls and methods of reducing of other losses	8
V	Constructional details of hydraulic and other types of couplings, torque convertors, servo-motor	5
VI	Constructional details of various types of pumps, their drives and automatic starting, airconditioning. Constructional details of various types of drought fans, their drives and automatic starting. Types of wear on fans and pumps and their effects, detection of unbalance in fans and pumps, instruments for measuring vibrations, methods of primary balancing-balancing instruments and their use.	9
VII	Coal handling plant (i) Sequential operation, (ii) conveyor and conveyor drives, (iii) tensioning arrangements, (iv) maintenance of guide rollers, (v) sway switches/slip switches, (vi) beetle chargers for wagon marshalling, (vii) wagon tippers and coal crushers, weighing of coal, different types of weighing bridges and weight meters, storage problems and prevention of spontaneous combustion. Sampling of coal/British Standards Specification/Indian Standards Specification, procedure and proximate analysis.	8
VIII	Water treatment-hardness, pH value clarifiers, treatment, phosphate and hydrazine dosing, base exchangers.	6
IX	Annual overhaul and inspection of turbine and auxiliary plant, condenser tube cleaning, maintenance of pumps, lubrication system, recycling of lubricating oil and selection of lubricant, condenser tube materials wear and tear and effect of local water conditions, types of failure, detection, preventive maintenance and retubing of condenser.	10
X	Maintenance practice-valve grinding methods, high pressure joints, heat insulation methods, pipework, alignments, beating, scraping & matching practice, radiography and stress relieving methods	6
XI	Indian Boiler Regulations and other statutory regulations.	4
XII	Workshop, fabrication of spares, repairs and maintenance of mechanical equipments such as vehicles, tractors, dozers, shunters, cranes and hoists, welding-modern techniques and their applications in maintenance of boilers, turbine & associated plant.	10
XIII	Compositions, properties and behaviour of engineering materials used in power stations.	8
		<hr/> 105
Common course for mechanical and electrical		<hr/> 186
Supplementary course for mechanical		<hr/> 105
Total Hours		<hr/> 291 <hr/>

2. SPECIALISED ELECTRICAL COURSE FOR OPERATING AND SUPERVISORY STAFF WHO WILL BE ENGAGED IN THE ELECTRICAL SIDE OF THE POWER PLANT.

Item No.	Particulars	Number of Hours
1.	2.	3.
I	Generator protection – earth fault, rotor and stator, negative phase sequence, loss of excitation, differential protection, back up protection, reverse power-protection, under voltage protection, constructional details of the relays used, method of setting and their testing, overload protection and over heating of rotors.	15
II	Transformers protection, Buchholz relay, overcurrent, differential and earth fault protection, types of relays used, their construction, testing and settings.	6
III	Transformers, commissioning-dielectric strength of oil, insulation resistance, tap changers, filtration of oil, precommissioning testing. Tan δ resistivity of oil and preventive maintenance of transformers.	6
IV	Circuit breakers, commissioning and maintenance, isolators, disconnectors, busbar arrangements, charging, synchronising with the grid, disconnecting for repairs, maintenance of switchgear contactors.	8
V	Maintenance of equipments in the outdoor switchyard, current transformers, potential transformer and lightning arrestors, operation and maintenance Bus differential protection.	6
VI	Cables, control, high voltage and extra-high voltage types, layouts, testing and maintenance.	8
VII	Principle of electronic controls and transistorised circuits	5
VIII	Pneumatic and di-electric transmitters and receivers, servomotors.	6
IX	Interlocking sequential control circuits, details of components used.	7
X	Calibration and testing of various types of instruments, indicating, measuring instruments, recorders and analyser.	8
XI	Statutory Electricity Acts and rules, permit procedure	4
XII	Starting and control equipments of various types of motors, Station Battery-care & maintenance, trickle charging and extended charging, operation and maintenance of rectifiers and battery charges.	8
XIII	Economic load despatch, power system control and operation, MVAR-control, voltage regulation and frequency control, carrier current equipments, telephones, telemetering	5
XIV	Station emergency lighting arrangements	1
		93
Common course for electrical and mechanical		186
Supplementary course for electrical		93
Total Hours		279

APPENDIX III

**SYLLABUS FOR SKILLED PERSONS FOR ASSISTING THE OPERATION AND
MAINTENANCE OF THE THERMAL POWER STATIONS**

(General course for Electrical and Mechanical)

Item No.	Particulars	Number of Hours
1.	2.	3.
I	General description of thermal power stations and outline of power station operation	5
II	Fundamental units and their conversion (mechanical, electrical, thermo-dynamics)	2
III	Fuels and combustion types of fuels – their properties and testing.	1
IV	Boiler and boiler house plant and auxiliaries	10
	1. General description.	
	2. Arrangement of boilers.	
	3. Boiler auxiliaries.	
	4. Boiler instrumentation.	
	5. Fabrication and assembly of different parts of boiler and its accessories.	
	6. High pressure welding in boilers.	
	7. Arrangement of pulverised fuel boiler in a modern thermal power station.	
V	Water conditioning, pretreatment and demineralisation.	4
VI	Ash handling – electrostatic precipitation and mechanical dust collector-function and description of two types.	2
VII	Turbine and turbine house auxiliaries:	5
	1. Fundamental principle of steam turbine.	
	2. Theory and operation of steam turbine.	
	3. Governing and protection of turbine.	
VIII	Handling of turbines and boilers under emergency conditions	4
IX	Condensor and vacuum extraction plant:	3
	1. Purpose and function.	
	2. Construction of surface condensor and vacuum pumps.	
X	Regenerative feed water heating-Constructional details of low pressure and high pressure feed water heaters, deaerators and evaporators.	2
XI	Cooling water systems and cooling towers.	1
XII	Flow diagrams of basic cycles:	12
	1. Coal handling.	
	2. Steam and condensate.	
	3. Ash and slag handling.	
	4. Station services, domestic water, airconditioning, ventilation, lifts.	
	5. Air services, air compressors, switchgear.	

1.	2.	3.
	6. Bearing cooling and general service water systems.	
	7. Circulating water systems.	
	8. Feed water and reheating plant.	
	9. Fuel oil system.	
	10. Station batteries and battery charging equipment.	
	11. Station lighting, power supply and distribution Boards.	
XIII	Station instrumentation and controls.	8
XIV	Fire fighting installations in a thermal power station.	2
XV	Electric shocks, acid burn, alkali wounds, chlorine gas poisoning and their treatment.	3
XVI	Duties and responsibilities of operators and plant attendants, carrying out instructions, reporting to supervisors, recording readings, unusual occurrences, expected behaviour, discipline, sincerity, cleanliness and love for machines	3
XVII	Personnel safety equipment, cleanliness, caution and care in power station working.	3
XVIII	How electricity is generated, transmitted and distributed i.e. generator to consumer service board	2
XIX	Fundamental units, conversion and measurement of electrical quantities.	1
XX	Principle and working of alternating current and direct current generators and their parallel operation.	2
XXI	Principle and working of transformers and their parallel operation.	2
XXII	Principle and working of alternating current and direct current motors, their speed characteristics, controls.	2
XXIII	Storage battery-principle, construction and charging.	1
XXIV	Alternator cooling, different systems of cooling, advantages of hydrogen cooling over others, hydrogen plant.	2
		<hr/> 82

APPENDIX IV

1. SPECIALISED ELECTRICAL COURSE FOR SKILLED PERSONS WHO WILL BE ENGAGED ON THE ELECTRICAL SIDE OF THE POWER PLANT.

Item No.	Particulars	Number of Hours
1.	2.	3.
I	Alarm systems – Visual and audible	2
II	Isolators, circuit breakers and contactors	3
III	Earthing and neutral grounding necessity of methods for safety rules while handling electrical equipments	4
IV	Motor winding and repairs	4

1.	2.	3.
V	Maintenance of internal telephones and primary air systems	3
VI	Meggering and testing of wiring and cable faults	3
VII	Maintenance of electrical motors	6
VIII	Maintenance of electrical switchgear	8
IX	Fuses-rewirable type-catridges type high rupturing capacity fuse, constructional features of fuse and fuse sockets, knife type high rupturing capacity fuses-use of pullers for insertion and removal, colour code for fuse rating.	8
X	Motor starters and their applications direction line, star-delta, rotor resistance	5
XI	Meggers, avometers, voltmeters, ammeters, wattmeters, energy meters-general information about their use	6
XII	Maintenance of transformers & Tap changer	6
XIII	Jointing of low & medium voltage cables	4
XIV	Connections, earthing, principles of operation of all small distribution transformers	2
XV	Current & potential transformers, purpose, connection and use	2
XVI	Various types of drive	2
XVII	Elementary knowledge of Engineering material & their properties	2
XVIII	Lubrication & cooling system	4
		74
Common course for electrical and mechanical		82
Supplementary course for electrical		74
Total Hours		156

2. SPECIALISED MECHANICAL COURSE FOR SKILLED PERSONS WHO WILL BE ENGAGED IN THE MECHANICAL SIDE OF THE POWER STATION.

Item No.	Particulars	Number of Hours
1.	2.	3.
I	Types of bearing and their uses	2
II	Types of valves-safety valve, suction valve, delivery valve, non-return valve, bypass valve, drain valve, air release valve, control valve, float operated valve, solenoid operated and pneumatically operated valves and their applications.	5
III	Pressure gauges-Bourden type gauge, monometer, vacuum gauge, barometer, principles of operation, absolute pressure, gauge and vacuum pressure and their inter relationship.	5

1.	2.	3.
IV	Temperature indicators, mercury thermometers, resistance thermometers, thermocouples, pyrometers, gas thermometers, temperature alarm	4
V	Level gauges-different types-Level Alarm	3
VI	Flow meters-steam and water-general principles	3
VII	Couplings-different types, rigid, flexible, magnetic and fluid couplings	2
VIII	Clutches-different types and uses	2
IX	Maintenance of pneumatic measuring instruments, servometers, power cylinders and other thermostats, monostats	2
X	Maintenance of instruments, recorders, clocks	4
XI	Vibration-general knowledge of their causes, effects, remedies, misalignment, wornout bearings, vibration-fed to foundations, cracking, eccentricity and differential expansion, their causes, remedies.	5
		<hr/> 40
Common course for electrical and mechanical		82
Supplementary course for electrical		40
Total Hours		<hr/> 122 <hr/>

APPENDIX V

SYLLABUS FOR OPERATION AND MAINTENANCE STAFF WHO WILL BE ENGAGED IN THE OPERATION AND MAINTENANCE OF HYDRO-ELECTRIC GENERATING STATION.

Item No.	Particulars	Number of Hours
1.	2.	3.
I	Concept of a modern hydro station:Type of stations, its role in the power systems, base load, peak load operation, plant layout, capacity; underground power station, hydraulic and electrical design, features, interconnection with other stations	3
II	Hydraulic system; reservoirs-type of reservoirs, storage capacity, operation of reservoirs, intake tower, surge tank, tunnels, forebays and penstocks, protection against water hammer and negative pressure in penstocks, provision for draining penstocks.	3
III	Types of valves-Butterfly valve, spherical valve, needle valve, their operation and control	3
IV	Water turbines-types of turbines; their characteristics, ratings, specifications, constructional details	2
V	Governing system; control circuit for governing, types of governors, pendulum, hydraulic, electronic	3

1.	2.	3.
VI	Generator: type and rating, cooling and ventilation system, bearing cooling arrangements, lubrication system, construction and characteristics of generators, split-phase double layer winding, synchronising, loading, grounding of generator neutral	3
VII	Excitation system, types of exciters, voltage, control, automatic voltage control, amplidyne control, magnetic amplier	5
VIII	Generator protection: earth fault (rotor and stator), negative phase sequence, differential protection, backup protection, reverse power protection, under voltage protection, constructional details of the relays used, method of setting and their testing.	10
IX	Hydraulic and electrical protective devices, load frequency control	3
X	Starting, shutting down and operation procedure	3
XI	Power transformer connections, parallel operation, three single phase unit versus three phase unit, regulation, voltage control, tap changing, weights and size, grounding	5
XII	Transformer protection: Buchholz relay, over current, differential and earth fault protection, types of relays used, their construction, testing and settings	5
XIII	Transformers-commissioning: Dielectric strength of oil, insulation resistance tap changer, filtration of oil, precommissioning testing	3
XIV	Cooling system for transformers	2
XV	Circuit breakers, isolators, disconnectors, busbar arrangements, charging and synchronising with the grid, disconnecting for repairs, maintenance of switchgear contactors	4
XVI	Maintenance of equipments in the outdoor switchyard current transformers, potential transformers and lightning arrestors, erection, operation and maintenance	4
XVII	Cables-high voltage, oil filled cable, types of cables used, rating of cables, layout, testing	4
XVIII	Principle of electronic controls and transistorised circuits	3
XIX	Pneumatic and electric transmitters and receivers, servomotors	3
XX	Control Board-layout, indicating and recording instruments for monitoring and supervision, remote control of various equipments, signalling and interlocking, automatic reclosure of breakers on outgoing lines and annunciation system	3
XXI	Interlocking sequential control circuits, details of components used	4
XXII	Calibration and testing of various types of instruments, indicating, recording and analysers	4
XXIII	Study of communication system	1
XXIV	House turbine set-its functions and use	1
XXV	Station transformers, alternating current, auxiliary supply, essential auxiliaries, auxiliaries in emergency, study of single line diagrams	3
XXVI	Station Direct Current system-storage battery, rectifiers, motor generator set etc. their control and operation, standby source of station power, automatic change over to standby source of supply	3
XXVII	Records-(hourly, daily, monthly, annually) of operations	2

1.	2.	3.
XXVIII	Flow diagram and single line diagram for hydraulic and electrical system in the station	5
XXIX	Air conditioning and ventilation plant, compressors	2
XXX	Operation under emergency conditions	2
XXXI	General plant maintenance procedures	3
XXXII	Cranes, hoists-characteristics and controls	2
XXXIII	Statutory Electricity Acts and Rules, permit procedure	2
XXXIV	Fire fighting	6
XXXV	General safety precautions, first-aid	6
XXXVI	Personnel management, duties and responsibilities, labour laws & labour welfare	4
Total Hours		124

APPENDIX VI

SYLLABUS FOR OPERATION AND MAINTENANCE STAFF IN EXTRA-HIGH VOLTAGE SUB-STATION.

Item No.	Particulars	Number of Hours
1.	2.	3.
I	Layout and location of 220/132/66/33 K.V. sub-station	4
II	Main equipments used together with their specifications	3
III	Construction of high voltage lines, types of towers, types of insulators and their electrical and mechanical characteristics	3
IV	High tension feeders, their load carrying capacities	1
V	(i) Alternating and direct currents, relation between voltage, current, power, reactive power & common units in use. Power factor, Ohm's Law, resistance, reactance, impedance, percentage impedance. Three phase vectors, phase displacement between current and voltage	3
	(ii) Basic principle of transformation, magnetisation, hysteresis, reluctance, retentivity, electromagnets Flux density, ampereturns, equation for transformation etc.	4
	(iii) Two winding, three winding and auto transformers, grounding transformers, salient features of shell type and core type transformers, hot rolled and cold rolled steel cores, stampings and their assembly Different vector groups and terminal connections.	4
	(iv) Transformer fixtures e.g. Buchholz relay, on-load and off-load tap changer, breathers, conservators, bushings of different types, thermometers, indicators, alarms.	4

1.	2.	3.
	(v) Cooling of transformer and oil, different methods of cooling, importance of oil filtering and drying-out of transformers, dielectric strength of oil, different varieties of filters and their comparison, types of raidators.	4
	(vi) Transformer tests-failures and causes, maintenance and repairs	3
	(vii) Parallel operation, regulation, voltage control, tap changing, commissioning test	5
VI	Breakers:	
	(i) Functions of breakers, their action	
	(ii) Different types of outdoor and indoor breakers e.g. bulk oil, minimum oil and airblast, principles and their applications.	
	(iii) Operating mechanism, manual, spring, hydraulic, pneumatic, motor.	
	(iv) Current rating, rupturing capacity, clearance time.	
	(v) Breaker maintenance, failures and their causes, commissioning procedure.	8
VII	Busbars:	
	(i) Indoor busbars, their capacity, forces on them during short circuit, busbar mountings and their clearances.	
	(ii) Strung and tabular type busbars, their current ratings, supports, jumpers, clearances.	
	(iii) Busbars fittings and connectors.	
	(iv) High Voltage and Extra-high voltage cables, types, their maintenance and testing.	6
VIII	Current and potential transformers:	
	(i) Types of current and potential transformers, their working principles, ratings, accuracies.	
	(ii) Functions of current and potential transformers	
	(iii) Failures of current and potential transformers, their causes	3
IX	Isolators:	
	(i) Tilting and rotating isolators, with and without arcing horns, earthing blades, current ratings, breaking of circuits by isolator, interlocking with circuit breaker	
	(ii) Maintenance of isolators	3
X	Lightning arrestors:	
	(i) Simple description of lightning phenomena and surges.	
	(ii) Construction of lightning arrestors and the principles of their working.	
	(iii) Different type of lightning arrestors and ratings.	
	(iv) Earthing and location of lightning arrestors	3

1.	2.	3.
XI	Control Room: (i) Necessity and function of a control board, types of boards, instruments on the board. (ii) Functions of the various relays and indicators, Mimic diagram indicators, annunciator and alarm characteristics of relays, testing and setting of relays. (iii) Remote control of breakers, isolators, tap changers, indicators on the control board. (iv) Control and power cables.	10
XII	Auxiliary supply: (i) Current and ampere-hour ratings of batteries, battery charging equipment, checking of specific gravity of electrolyte, maintenance of batteries. (ii) Importance of direct current supply and its functions (iii) Auxiliary direct current supply	3
XIII	Clearance and Compliance of I.E. Rules, 1956: (i) Minimum clearance for different voltages between phases and phase to ground (ii) Indian Electricity Rules pertaining to sub-stations	3
XIV	Earthing: (i) Safety earthing and system earthing, the method of earthing e.g. solid earthing, resistance earthing, peterson coil earthing, earthing of lightning arrestor, importance and advantages of each type (ii) Different types of earth electrodes, earthing mats, recommended values of earth resistance, measurement of earth resistances	3
XV	Maintenance: (i) Maintenance of log sheet and other records (ii) The importance of maintenance of good records	3
XVI	Safety: (i) Safety procedures and procedures for giving line clear and taking it back, Maintenance of records of line clear (ii) First-aid, artificial respiration and shock treatment	10
XVII	Interlocking and sequential operation of different equipments	1
XVIII	Synchronising, charging and discharging of high voltage lines. Live line testing	3
XIX	Calibration and testing of various types of equipments indicating and measuring equipments, recorders, analysers	4
XX	Handling emergency conditions	3
XXI	Diagnosing troubles in the plant from instruments and annunciation	3
XXII	Study of carrier system	2
XXIII	Auxiliary equipments such as compressors, Station lighting etc.	1
XXIV	Fire fighting equipment – their operation, maintenance and refilling	1
XXV	Personnel management, duties and responsibilities, labour welfare and labour laws	4
Total Hours		115

APPENDIX VII
(I) ASSESSMENT FORM FOR OPERATING AND SUPERVISORY STAFF

Name of the Trainee
 Period : From to (extended period).
 Working in
 Section
 Department

Particulars	Marks allotted	Marks given	Remarks
1.	2.	3.	4.
1. Punctuality and attendance	+(5)		
(a) Is he reluctant to continue on overtime	-(1)		
(b) Is he in the habit of taking leaves at the eleventh hour	-(1)		
(c) Does he insist on compensatory off	-(1)		
2. Intelligence and grasp:			
(a) Does he have full knowledge of the plant and equipment on which he is working and follows the instructions given to him and can execute them properly	+(10)		
(b) Is he industrious, hard working and painstaking	+(5)		
(c) Has he shown any special skill of operation in saving plant & equipment in trouble or emergency ?	+(10)		
3. Temperament and behaviour:			
(a) Behaviour with superiors/colleagues and subordinates	+(5)		
(b) Capacity to take quick and correct decisions	+(5)		
(c) Capacity to handle independent responsibility	+(10)		
4. Any special qualifications-capacity to execute a particular or difficult job economically, intelligently, resourcefully or with special skill	+(10)		
5. Judgment of the candidate by taking viva-voce test or by asking questions verbally	+(40)		
Total marks	+	100	

The marks may be given as below:-

Excellent	Very good	Good	Average	Below average
100-91%	90-71%	70-61%	60-51%	Below 51%

Special Remarks if any:-

Station Superintendent

Section-in-Charge

(II) ASSESSMENT FORM FOR OPERATING AND SUPERVISORY STAFF

(For use of the Training Department)

1. Name of the Trainee
2. Date of birth/age
3. Training period : From(Months)
4. Technical qualification
-
-
5. Specialisation if any
6. Practical experience
7. Marks secured in periodical tests:

Test	Date	Written (75)	Viva (25)	Total
I Test				
II Test				
III Test				
Final Test				

8. Percentage of marks secured in all the tests:
9. Gradation : (A, B, C, etc.)
10. General Remarks and Recommendations:

Director of the Institute

(III) ASSESSMENT FORM FOR SKILLED PERSONS TO ASSIST OPERATORS AND SUPERVISORS

Name of the Trainee

Period : From to (extended period).

Working in

Section

Department

Sl. No.	Particulars	Marks allotted	Marks given	Remarks
1.	2.	2.	3.	4.

1. Punctuality and attendance:
 - (a) Does he attend the duty punctually or remain absent without prior intimation frequently + (5)

- | | | |
|----|--|--------|
| 2. | Intelligence and grasp: | |
| | (a) Does he have full knowledge of the plant and equipment on which he is working and follows the instructions given to him and can execute them properly | + (10) |
| | (b) Is he industrious, hard working and painstaking | + (5) |
| | (c) (i) Has he shown any special skill of operation in saving plant & equipment in trouble or emergency . | |
| | OR | |
| | (ii) Has he shown any special skill or innovation in any maintenance job. | + (10) |
| 3. | Temperament and behaviour: | |
| | (a) Behaviour with superiors/colleagues | + (5) |
| | (b) Capacity to take quick and correct decisions by himself or to point out the discrepancies to superiors promptly while attending auxiliary plant and equipment. | + (5) |
| | (c) Capacity to take independent charge as auxiliary plant attendants (Name of the auxiliary plant) | + (10) |
| 4. | Any special qualifications: | |
| | (a) Is he suitable for any other plant other than the one mentioned above at 3(c) | |
| | (b) Can he record the readings correctly | |
| | (c) Is he suitable for any particular skilled maintenance job as an artisan. | + (10) |
| | (d) Has he specialised in any particular trade such as winder, high pressure welding, etc. | |
| 5. | Judgment of the candidate by taking viva-voce test or by asking questions verbally about power plant and equipment | + (40) |

The marks may be given as below:-

Section-in-Charge

ASSESSMENT FORM FOR SKILLED PERSONS TO ASSIST OPERATORS AND SUPERVISORS

(For use of the Training Department)

1. Name of the Trainee
2. Date of birth/age
3. Training period : Fromto(Months)
4. Highest technical qualification
5. Specialisation, if any
6. Practical experience
7. Marks secured in periodical tests:-

Test	Date	Written (60)	Viva (40)	Total
I Test				
II Test				
III Test				

8. Job test (110 Marks)
9. Percentage of marks secured in all the tests:
10. Gradation : (A, B, C, etc.)
11. General remarks and recommendations:

Director of the Institute
